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HERBARIUM AFRICANUM :

NOVAE SPECIES E GENERIBUS LOBELIAE, MONOPSIS, CYPHIAE.

F. E. WIMMER, WIEN.

Bei der Revision afrikanischer Lobeliaceen, von denen die meisten im Herbar Kew, eine kleinere Anzahl im Government Herbarium Salisbury (Southern Rhodesia), im Herbar des Naturhistorischen Museums Paris, Wien und Berlin niedergelegt sind, konnte ich 16 neue Arten und 8 Varietäten feststellen, darunter zum erstenmale eine wildwachsende *Lobelia* mit gefüllter Corolle.

Unter obigem Material fand ich auch einige *Cyphia*-Species, von denen ich wegen ihrer auffälligen Merkmale annehme, dass sie neue Arten sind, obwohl ich viele Originalspecies derselben, deren Diagnose ausserdem oft ungenügend ist, nicht sehen und nicht vergleichen konnte.

I. CAMPANULACEAE—LOBELIOIDEAE :

1. LOBELIA L.

Subgenus *Lagotis* E. Wimm., sect. *Hemipogon* Bth., subsect. *Leiosperma* (semina laevia, subtiliter reticulata et interdum subtilissime longitudinaliter striolata).

Grex PTEROCAULINAE E. Wimm. i. Annal. Naturhist. Mus. Wien LVI (1948) 343.

(Caules et praecipue rami late alati, herbae debiles).

1. *Lobelia anceps* L.f., non Thunb., f. **pleniflora** nov.f.

Praeter corollam nulla differentia a planta typica! Corolla duplicata, 10 mm. longa, stamina et ovarium \pm abortiva, calycis receptaculum exinde fere nullum, calycis lobi subulati, 1 mm. longi et fere liberi. Pedicelli circiter 8 mm. longi, basi biglandulosi, parum breviores quam bracteae sublineares.

COMORES insulae : Anjouan (*Boivin*, anno 1847–52—Hb. Paris).

—f. **ugandensis** E. Wimm. n.f.

Folia argute dentata ; bracteae florum superiorum pedicellis vulgo breviores ; in specimine e monte Elgon etiam caules minus late alati.

UGANDA : Kiwuwu, moist ground, 4,000 ft. VIII. ; Mt. Elgon in coffee patch, Butadiri (*R. A. Dümmer* n. 189, 3722.—Hb. Zürich, Kew).

2. *Lobelia alata* Labill. var. *longisepala* E. Wimm. var. nov.

Calycis lobi angustissime triangulares, 3–6 mm. longi, dimidio breviores quam filamenta. Corolla 14 mm. longa, lobi inferiores corollae cuneati; tres fasciculi pilorum in parte dorsali anteriore tubi antherarum vix visibiles. Bracteae pedicellos 6–10 mm. longos fere duplo superantes. CAPE PROV.: Distr. Humansdorp, Zitzikama, Coldstream, damp forest glades, IV. (*E. E. Galpin* n. 9371, 9369—Kew).

3. *Lobelia molleri* f. *latifolia* form. nov.

Folia inferiora ovata, bas isubcordata, vel oblongo-ovata, basi rotundata, 15×11 – 35×22 mm., reliqua ovato-oblonga, 20×8 mm., et angustiora, apice acuta, margine adpresse vel subexerte dentata vel denticulata, petiolo 3–10 mm. longo, de caetero tenuissima, utraque facie pilis hyalinis sparsis obsita. Flores pauci, solitarii in axillis foliorum minorum, saepe lanceolatorum, floribus longiorum. Corolla circiter 5 mm. longa, verisimiliter alba. Semina ellipsoidea, fusca, nitida, longitudinaliter levissime striolata, circiter 0.6 mm. longa.

SOUTHERN RHODESIA, Distr. Chirinda (*H. Wild* n. 2142—Kew.).

Grex ROSULATAE *E. Wimm.* l.c. 342.

(Foliorum radicalium vel subradicalium plurima rosulata, caulina pauca, multo minora et angusta, vel subnulla. Inflorescentia pedunculata, racemosa).

4. *Lobelia nuda* Hemsl. var. *rosulata* (*S. Moore*) *E. Wimm.* comb. nov.

Planta gracilior foliis rosulatis minoribus, rotundo- vel elliptico-spathulatis et etiam oblanceolatis, sparse pilosis. Corolla plerumque major ("blue with yellow spot on lower lip, darker mark on outside of tube behind upper lip" or "white with pale blue lobes").

SOUTHERN RHODESIA: Distr. Melsetter, Jarka Forest Reserve, amongst grass beside stream, 3,800 ft., 10.X.1950 (*K. E. Sturgeon*—Gov. hb. Salisb. n. 30467—Portuguese E. Africa: Distr. Musapa Gap, Chimanimani Mts., on poor sandstone soil, 2,800–3,000 ft. (*H. Wild* n. 3534, *N. C. Chase* n. 2932—Gov. Hb. Salisb. n. 30457, 31194).

Grex ERINIFORMES *E. Wimm.* l.c. 346.

(Herbae decumbento-ascendentes vel erectae, graciles, 3–60 cm. altae. Folia in caule sparsa, inferiora vulgo latiora, cetera paulatim angustiora, radicalia pauca vel mox emarcida; flores plerumque longius pedicellati in racemis laxis. Maxima pars *Lobeliae* huc pertinet).

5. *Lobelia altimontis* *E. Wimm.* sp. nov.

Caules e radice longa perpendiculari plures, erecti, circiter 60 cm. alti, sparse foliati, angulati, in angulis hirsuti, versus inflorescentiam glabrescentes. Folia ima tempore florationis emarcida vel decidua, ignota; caulina sessilia, linearia, 35×3 – 5 mm., basi vix angustata, apice acuta, margine dentibus acutis remotis (plerumque 3 in utroque latere) munita, glabra vel subhirta et versus basin \pm ciliata, non raro purpurascens suffusa. Inflorescentia glabrata. Flores in racemis longiusculis secundis laxissimis. Bracteae lineares, foliaceae, pedicello plus duplo breviores. Pedicelli florigeri 12–30, fructigeri ad 70 mm. longi, glabri, patentes, videntur ebracteolati. Calycis receptaculum

obconicum usque ellipsoideum ; sepala subulata, 2–3 mm. longa, glabra, integerrima, suberecta. Corolla 10 mm. longa, coerulea fauce albescens, glabra : lobi 2 superiores oblanceolati, minores ; lobi inferiores in labium tripartitum coaliti, elliptici, mucronulati, 3 mm. longi. Stamina 5 mm. longa : antherarum tubus in dorso glaber vel pilosulus, 2 inferiores apice setulis penicillatae. Capsula oblongo-obconica. Semina ellipsoidea, fusca, circiter 0.5 mm. longa, subtilissime longitudinaliter striolata.

SOUTHERN RHODESIA : Marandellas, Pre-rain-flora, Sept. 1917 (*J. A. S. Walter* n. 2364—Kew) ; Distr. Melsetter, summit of "The Gomo" (Pork Pie) among grass and mountain herbage, XII. (*N. C. Chase* n. 1424—Gov. Hb. Salisb. n. 23955, etiam Hb. Wien, Kew) ; Distr. Inyanga, Pungwe, I. (*T. C. Hopkins*—Gov. Hb. Salisb. n. 9396, Wien).

Habitu similis *Lobeliae nudae* Hemsl., sed folia rosulata desunt.

6. *Lobelia brassiana* E. Wimm. sp. nov.

Herba flaccida, glaberrima. Caules ascendentes, teneri, circiter 40 cm. alti, parce ramosi, remote foliati, e foliorum decurrentia angustissime alati. Petioli ad 5 mm. longi. Folia oblongo-ovata usque ovato-lanceolata, 20–30 × 8–10 mm., summa (bractealia) lanceolata, 15 × 2 mm., ad apicem obtusum acuta, basi in petiolum breviter angustata, margine ± inaequaliter crenata. Flores solitarii in axillis foliorum minorum remoti, racemum laxissimum fingentes. Pedicelli 20–40 mm. longi, filiformes, ebracteolati, erecto-patentes. Calycis receptaculum brevissime turbinatum ; sepala filiformia, 4 mm. longa, parce ciliata, patentia, longitudine filamentorum. Corolla bilabiata, glabra, 8–9 mm. longa, azurea, albo-oculata et obscurius maculata : lobi 2 superiores angusto-lanceolati, erecti ; lobi inferiores labium tripartitum formantes, subobovato-oblongi, apice mucronulati, circiter 2 mm. longi. Stamina tubus 5 mm. longus : filamenta glabra, antherae nigrescentes, subglabrae, 2 inferiores apice barbatae, 3 superiores apice albo-papillosae. Fructu non viso.

NYASALAND : Zomba, 1,150 m., massed on moist banks in ravines, V. (Vernay Nyasaland Exped. 1946 no. 16040, 1g. *L. J. Brass*—Kew).

7. *Lobelia melleri* Hemsl. var. *grossidens* E. Wimm. var. nov.

Herba glaberrima. Folia profundius et acute dentata. Sepala breviora (2 mm. tantum 1g.), non ciliolata. Corolla videtur paulo longior (10 mm.).

TROPICAL AFRICA : Mt. Elgon, 7,000 ft., spreading to 8-inch., X.–XI. 1930 (*Major & Lugard* n. 149—Kew).

8. *Lobelia orbiculata* E. Wimm. sp. nov.

Herba annua, tenera, glaberrima. Caules filiformes, radicales, angulati, remote foliati (internodia inter folia 20–25 mm. 1g.), eramosi in nostro specimine, ad 50 cm. longi. Folia tenuia, inferiora et partim etiam media orbiculata, 6 × 7 mm., superiora elliptica usque lanceolata, 5 × 5 mm. et minora, margine serrato-dentata—dentes acuti (4–6 in utroque latere)—apice acuta, basi apud inferiora rotundato-truncata et petiolo tenui 2–3 mm. longo praedita, apud cetera cuneata vel acuta et in petiolum indefinitum angustata. Flores in racemis laxissimis, 5–7-

floris. Pedicelli 6–8 mm., fructiferi ad 18 mm. longi, ebracteolati, patentes, bracteis linearibus circiter duplo longiores. Hypanthium turbinatum vel mox semi-ovoideum; lobi calycini subulati, integerrimi, patentes, 2 mm. longi. Corolla coerulea, glabra, 9 mm. longa: lobi 2 superiores sublineares, erecti, minores; labium inferius trifidum lobis oblongis, basi albescentibus et obscurius-coeruleo-maculatis. Stamina fere 5 mm. longa: filamenta glabra; antherarum tubus nigrescens, superne ante apicem pilosulus, 2 inferiores apice barbatae. Capsula ellipsoidea, fere semi-infera. Semina oblongo-ellipsoidea, badia, subtilissime longitudinaliter striolata, vix 0.5 mm. longa.

UGANDA: Mt. Debasien, Karamokja, 6,700 ft., Zebiel, scrambling to 1 ft. 8 (*A. S. Thomas* n. 2221—Kew).

—f. **subcuneata** form. nov.

Folia omnia basi cuneata et minus profunde dentata, internodia foliorum breviora (5–15 mm.).

ABERDARE MTS. (*Evan James*, anno 1905—Kew).

9. *Lobelia polyodon* E. Wimm. sp. nov.

Caules vagantes, caespites parvos formantes, ramosi, subpubescentes, foliosi, superne fere nudi, ad 40 cm. longi. Folia longe petiolata (3–8 mm.)—petioli ciliati vel glabrescentes—lamina glabra, rotundo-ovata et ovata, basi truncata et in petiolum breviter angustata, 7–12 × 7–9 mm., ea superiorum sensim angustior et minor et in petiolum cuneatim angustata, apice rotundata vel acuta, margine inciso-dentata vel et duplo-dentata—dentes acuti et irregulares. Flores in racemo laxo, 5–7-floro. Bractee lineares, dentatae, pedicello multo breviores. Pedicelli 12 mm., fructiferi ad 20 mm. longi, glabri, basi bibracteolati, patento-ascendentes. Hypanthium obconico-oblongum; sepala 1–2 mm. longa, anguste triangularia, integerrima, suberecta. Corolla 7–9 mm. longa, glabra, coerulescens vel dilute coerulea et alba: tubus 3–4 mm. longus; lobi 2 superiores oblanceolati, parvi; lobi 3 inferiores labium tripartitum formantes, obovati, apice mucronulati. Staminum tubus 3–4 mm. longus: filamenta glabra; antherae in dorso pilosulae, 2 inferiores apice barbatae. Capsula obconica vel obconico-ellipsoidea, subinfera, 5–6 mm. longa. Semina ellipsoidea, fusca, subtilissime striolata, fere 0.5 mm. longa.

PORTUGUESE EAST-AFRICA & SOUTHERN RHODESIA: Chimanmani Mts. 1,850 m., in grass wet ground straggling, 6.VI.1949 (*H. Wild.* n. 2902—Gov. Hb. Salisb. n. 23746, Wien, Kew); Distr. Chimanmani Mts., small bush 1 ft. high (*R. C. Munch* n. 69—Gov. Hb. Salisb. 20999, Wien); Distr. Inyanga, Chipungu stream, XI. (*N. C. Chase* n. 1850—Gov. Hb. Salisb. n. 27047, Wien).

Similis quoad folia *Lobeliae nyikiensi*, sed ceterum diversa.

10. *Lobelia pubescens* Dryand. var. **holopsila** E. Wimm. var. nov.

Glaberrima. Folia caulina omnia ± spatulata, apice rotundata vel levissime emarginata et mucronulata, basi in petiolum brevem acuminata, margine 2 (3) dentibus subgrossis et parum adpressis munita, circiter 10 × 6 mm. Folia bractealia lanceolato-linearia vel oblanceolata, utrinque uni-dentata. Corollae lobi lanceolati.

CAP B.S.: Simon's Bay, near the water fall, XI. (*R. C. Alexander*—Kew).

11. *Lobelia sutherlandii* E. Wimm. sp. nov.

Herba videtur stolones subterraneos emittere, erecta, 6–15 cm. alta. Caulis simplex vel ramosus, angulatus, sparse hirsutus sicut folia, superne glabrescens et ex parte nudus. Folia alterna, inferiora spathulata, incluso petiolo indefinito 10–12 × 5 mm., reliqua sensim angustiora, cuneata usque oblanceolata et sublinearia, apice obtusa, margine crenulata vel denticulata—dentes 3–5 utrinque et versus apicem saepe accrescentes. Flores in racemo terminali, paucifloro (2–8), paulum pedunculato. Bractee foliaceae, sublineares, sessiles, pedicello saltem duplo breviores. Pedicelli 6–10 mm. longi, ebracteolati, patentes vel suberecti. Hypanthium late turbinatum, cum pedicello scabriusculum, 1.5 × 2 mm., sepal subulata, uninervata, patula, margine scabra aut obsolete denticulata, 2–3 mm. longa. Corolla 10 mm. longa, azurea, versus faucem alba et obscurius maculata, glabra: tubus 5 mm. longus, in latere ventrali pallescens et maculatus; lobi 2 superiores lineari-lanceolati, recurvati, minores; labium inferius trifidum, lobis obovatis, apice mucronulatis. Staminum tubus ad 6 mm. longus: filamenta glabra, pro maxima parte soluta; antherarum tubus 1 mm. longus, in dorso pilosulus, 2 inferiores apice barbatae. Capsula fere ellipsoidea, 5 mm. longa, subinfera. Semina subglobosa, fusca, reticulata et levissime lineata, circiter 0.5 mm. lg.

SOUTH AFRICA: Pondoland, Faku's Territory (*Sutherland*—Kew).

12. *Lobelia wildii* E. Wimm. sp. nov.

Herba debilis, subcaespitosa; caules decumbentes vel ascendentes, filiformes, ramosi, patento-pubescentes, versus inflorescentiam glabrescentes, sparse foliati, 20–40 cm. longi. Petioli 2–3 mm. longi, ciliolati. Folia lanceolata, summa linearia, 8–10 × 1–3 mm., utrinque acuta, margine interdum ciliolato dentibus callosis 2–3 munita, saepe purpure-senter suffusa, utraque facie parce hirta. Flores in racemis terminalibus, paucifloris. Bractee lineares, pedicellis circiter quadruplo breviores. Pedicelli 15–20 mm. longi, glabri, suberecti, basi mox biglandulosi, mox sine talibus. Calycis receptaculum obconico-oblongum; sepal subulata, 2.5 mm. longa, integerrima, patula. Corolla 10 mm. longa, coerulea (bright blue), glabra: lobi 2 superiores lanceolati, erecti, minores; lobi 3 inferiores labium tripartitum formantes, oblongi, apice mucronulati. Stamina 5 mm. longa: filamenta glabra; antherarum tubus atro-coeruleus, glaber vel in dorso pilosulus, 1 mm. longus, antherae 2 inferiores apice barbatae. Capsula ovoidea, 4 mm. longa, subinfera. Semina compresso-ellipsoidea, reticulata, obscuro-fusca, nitida, circiter 0.4 mm. longa.

SOUTHERN RHODESIA: Chimanimani Mts., Mt. Peza, in shade of rocks, 6,500 ft., 16.X.1950 and 8.VI.1949 (*H. Wild* n. 3619, type, 2864—Gov. Hb. Salisb. n. 30500 et n. 23599, Wien, Kew).

—var. **arcana** E. Wimm. var. nov.

Differt foliis obtusis, distinctius dentatis et parum longius petiolatis, virentibus, tenuioribus. Corolla pallide coerulea lutescenter oculata. Herba gracilior.

Distr. Marandellas Cave, on granite cave floor in humus, 4,500 ft., 5.IV. 1950 (*H. Wild* n. 3289)—Gov. Hb. Salisb. n. 27390, Wien.

Nil aliud quam forma loci.

Sect. HOLOPOGON *Bth.*

Subsect. DELOSTEMON *E. Wimm.*, Grex GENISTOIDES *E. Wimm.*

(Tubus stamineus paulo longior quam tubus corollae et e fissura dorsali ejusdem tubi prosiliens. Racemi florum distincte pedunculati).

13. *Lobelia chamaedryfolia* (Presl) A.DC. var. *confinis* *E. Wimm.*, v. nov.

Folia duplo triplove majora ($3-5 \times 1.5-2.5$ cm.) quam in typica spathulata, apice rotundata usque obtusa, basi in petiolum subciliatum alatum sensim angustata, margine obtuso-dentata, supra sparse, subtus in nervis sparsissime hirsuta. Pedicelli et hypanthium adpresse hirsuti. Bractea et bracteolae pedicellum 4 mm. longum fere aequantes. Corolla albo-rosea, 13 mm. longa lobis oblanceolatis.

SOUTHERN RHODESIA : Distr. Inyanga, Stapleford, 1,850 m., 18.V.1944 (*J. C. Hopkins*—Gov. Hb. Salisb. n. 12481, Hb. Wien.).

14. *Lobelia holstii* Engl. var. *subhirsuta* *E. Wimm.* var. nov.

Caulis imprimis in angulis, petioli et folia pilis patentibus vestiti. Pedicelli, hypanthium, corollae lobi extus adpresse hirti. Corolla circiter 11 mm. longa, "malvacea cum fauce alba". Folia spathulata, basi cuneata.

SOUTHERN RHODESIA : Distr. Inyanga, Downs on dolerite outcrops, 2,300 m., X.1946 (*K. Sturgeon*—Gov. Hb. Salisb. n. 16954, Hb. Wien.).

15. *Lobelia longipilosa* *E. Wimm.* sp. nov.

Caules ascendentes, ramosi, pilis mollibus septatis patentibus praediti. Folia sparsa, petiolata (3–5 mm.), sparse hirta, ovato-rotunda, basi truncata (vix subcordata), apice obtusa vel acutissima, margine grossius dentata (3–4 dentes acutissimi vel obtusi, sic quasi crenata), $10-23 \times 8-18$ mm., $10-12 \times 11-13$ mm. Flores in racemo pedunculato, terminali, 2–3-floro. Bracteae lineares integerrimae, pedicellos vix aequantes. Pedicelli 4 mm. longi, hirti, basi bracteolis 2 subulatis. Hypanthium turbinatum, patenter pilosum; sepala subulata, 3–7 mm. longa, integerrima, ciliata, suberecta. Corolla 16 mm. longa, "coerulea": lobi 2 minores recurvati, lanceolati; lobi 3 inferiores obovato-oblongi, apice mucronulati. Stamina 8 mm. longa, glabra: antherarum tubus solus 1.9 mm. longus, atro-violaceus, orificio circum piloso. Semina 1 mm. longa, trigona.

SOUTHERN RHODESIA : Chimanimani Mts. in shade of rocks, 6.VI.1949 (*H. Wild* n. 2869—Gov. Hb. Salisb. n. 23618, Wien, Kew).

Affinis *Lobelia cobalticae* S. Moore.

2. MONOPSIS Salisb.

16. *Monopsis malvacea* *E. Wimmer* sp. nov.

Herba caulibus pluribus ascendentibus stramineis, glabris setulis singulis hinc inde obsitis bene foliatis, circiter 20 cm. altis. Folia sessilia, alterna, membranacea, luteo-viridia, supra glabra, subtus in costa pilosa, in margine anguste incrassato sub lente scabra, ovata, ovato-oblonga, sursum sensim angustiora, summa fere linearia, 7–10 mm. longa, 2–5 mm. lata, apice obtuso vel acuto, basi subrotundata vel

obtusa, margine plerumque dentibus 2 in utroque latere antorsum curvatis munita, folia minora saepe uno dente tantum in parte inferiore. Flores 2-3, solitarii in axillis foliorum superiorum minorum. Pedicelli filiformes, adpresse pilosi sicut hypanthium turbinatum, 16-38 mm. longi, subpatentes, supra basin 2 bracteolis oppositis linearibus 4 mm. longis ornati. Lobi calycis lanceolati, 4 mm. longi, integerrimi, setoso-ciliati, patentes. Corolla 10 mm. longa "pallide malvacea", glabra exceptis nervis medianis exterioribus pilosis loborum: lobi 2 angustiores a tubo corollae usque ad basin soluti, 3 majores in labium trifidum uniti, elliptici, 3 mm. longi. Stamina in tubum connata, glabra: filamenta 5 mm., antherae 2 mm. longae et omnes apice barbatae.

SOUTH AFRICA: Swaziland, Hlatikulu, near marshy ground (*Miss M. M. Stewart* n. 115—Kew).—*M. unidentatae* proxime accedit.

II. CAMPANULACEAE—CYPHIOIDEAE:

CYPHIA *Berg.*

1. *Cyphia elata* *Harv.* var. *stenophylla* *E. Wimm.* var. nov.

Folia sublinearia, 2-7 cm. longa, 2-4 mm. lata, apice acuta, margine anguste revoluta, puberula scabriuscula, costa in facie inferiore prominens, nervi laterales subprominentes, venae inconspicuae. Flores in racemo spiciformi parum laxo. Bracteae sublanceolatae, acutissimae, pectiniformi-dentatae, fere longitudine floris. Pedicelli puberuli 1.3 mm. longi, basi bibracteolati. Sepala 5 mm. longa, fere linearia, dentata, scabriuscula. Corolla 8-9 mm. longa, lobi liberi labii trifidi 2 mm. longi. Stamina 5 mm. longa: filamenta pubescentia, antherae in dorso pilosae.

SOUTH AFRICA (*R. Schlechter*—Hb. Berl.).

Spicimen visum sine datis, fortasse nova species.

2. *Cyphia regularis* *E. Wimm.* sp. nov.

Glabra. Caulis erectus, foliatus, circiter 45 cm. altus. Folia lanceolata, in medio latissima, 10×0.6 cm., 7.5×1.4 cm. et minora, basi in petiolum indefinitum angustata, apice acuta, margine callose denticulata. Flores in axillis foliorum superiorum anguste lanceolatorum solitarii, ab invicem circiter 15-25 mm. distantes, foliis fulcrantibus multo breviores. Pedicelli circiter 3 mm. longi, glabri, infra calycem 2 bracteolis oppositis linearibus fere 3 mm. longis ornati. Hypanthium semigloboso-turbinatum, 2 mm. longum et 3 mm. latum; lobi calycini anguste triangulares, 2-3 mm. longi, patentes, integerrimi, glabri. Corolla subbilabiata, "violacea", extus glabra: 2 petala soluta sublanceolata, 10 mm. longa; labium trifidum 12 mm. longum, intus versus basin puberulum et fenestratum, segmenta fere 4 mm. longa. Stamina 5, libera: filamenta puberula, 3.5 mm. longa; antherae oblongae, in dorso dense villosae, 2 mm. longae. Stylus longitudine filamentorum, apice capitatus et villosulus. Fructum maturum non vidi.

N. NYASALAND, upper Loangwa River, 24.I.1897 (*J. G. Nicholson*—Kew).

3. *Cyphia longipedicellata* E. Wimm. sp. nov.

Caulis tenuis, 1 mm. diametens (partes superiores caulis tantum vidi!) glaber, distanter foliatus, scandens vel rectus, vix volubilis. Folia sessilia, linearia, $10-20 \times 1-2$ mm., apice acutiusculo et calloso, margine dentibus remotis callosis sursum subcurvatis et basalibus saepe magis productis munita, rigidiuscula, glabra. Flores solitarii in axillis foliorum superiorum parum minorum, ab invicem circiter 15 mm. distantes. Pedicelli 18–20 mm. longi, fere filiformes, minute puberuli, in medio 2 bracteolis minutis praediti, patentes. Hypanthium campanulatum, puberulum; lobi calycini anguste triangulares, integerrimi, glabri, patentes usque expansi, 5 mm. longi. Corolla subbilabiata, 12 mm. longa, intus extusque glabra: petala linearia, apice acuta et subciliata, fere aequilata, 3 inferiores in medio connata. Stamina 5, libera: filamenta glabra, 5 mm. longa; antherae oblongae, 2 mm. longae, in medio dorsi ciliatae, ceterum glabrae. Stylus 5 mm. longus, versus apicem in stigma pilosum ampliatus. Fructum maturum non vidi.

AUSTRO-AFRICA, regio occidentalis (R. Schlechter—Berl.).

4. *Cyphia reducta* E. Wimm. sp. nov.

Glabra. Caulis fere filiformis, volubilis, remote foliatus. Folia lanceolata usque linearia, $1.5-4$ cm. \times $1-3$ mm., apice acuta, ad basin in petiolum 3–6 mm. longum attenuata, margine remote callose denticulata. Flores in racemis valde laxis et longis dispositi, solitarii in axillis bractearum linearium, longitudine fere pedicellorum et ipsis adnatarum. Pedicelli filiformes, sursum curvati, glabri, 1–4 mm. longi, in medio 2 bracteolis parvis muniti. Calycis receptaculum turbinatum: sepala sublinearia, integerrima, vix 1 mm. longa. Corolla alba, interdum rubescens ("white pink tinged or white"), 3.5 mm. longa, intus extusque glabra: petala linearia, apice acuta, demum omnia soluta et recurvata. Stamina libera, 2 mm. longa: filamenta vix puberula, antherae in dorso parum pilosae. Stylus cum stigmate capitato pilosulo 1 mm. longus. Capsula subglobosa, semi-infera, 4 mm. longa, bilocularis, apice 2 valvis bifidis dehiscens. Semina plano-ellipsoidea, late alata, fusca, 1.2 mm. longa et 0.8 mm. lata.

SOUTHERN RHODESIA: Distr. Salisbury, Domboshawa, among grasses on granite slope, 1,650 m., 7.III.1946, 16.II.1947 (H. Wild n. 902, 1662—Gov. Hb. Salisb. n. 14546, 15748, Wien).

Affinis *Cyphiae sylvaticae* Ecklon, cuius forsitan varietas solum est, differt imprimis flore minuto et semine (semen *C. sylvaticae* duplo majus et obliqui-cuneiformis vel-ovale, minus late alatum).

5. *Cyphia mazoënsis* S. Moore var. *stellaris* E. Wimm. var. nov.

Folia ovato-oblonga, elliptica, oblonga, summa angustiora, ad 3.5 cm. lata, margine subcrenato-denticulata. Sepala anguste triangularia, 3.5 mm. longa, demum elongata, versus basin fimbriato-dentata, sub floratione suberecta, in fructu stellatim expansa. Flores in racemo laxo, axe saepe flexuoso cum pedicellis et calyce puberulo. Corolla rubescens ("pink") gracilis, 10 mm. longa, extus puberula. Stamina 3 mm. tantum longa: filamenta puberula; antherae apice ciliatae, ceterum videntur glabrae.

SOUTHERN RHODESIA : Distr. Inyanga, Stapleford, 1,800 m., 17.V.1844 (*J. C. Hopkins*—Gov. Hb. Salisbury n. 12477, Wien) ; on hillside near stream in forest clearing, climber on bushes with pink flow. 17.VII.1948 (*N. C. Chase* n. 894—Gov. Hb. Salisb. n. 22191, Wien) ; Distr. Umtali, Cecil, in cedar grove, 20.IV.1950 (*N. C. Chase* n. 2139—Gov. Hb. Salisb. n. 28085, Wien).

6. *Cyphia rivularis* E. Wimm. sp. nov.

Caulis volubilis, glaber, circiter 1 m. longus, 1–2 mm. in diametro, foliatus, foliorum internodia circiter 3 mm. longa. Petioli 3–7 mm. longi.

Folia elliptico-oblonga, 3–5.5 × 1.5–2 cm., apice basique acuta, margine antrorsum serrata. Flores in racemis laxis elongatis. Pedunculi 1–3-flori, puberuli, 5–6 mm. longi, bractea sublinearis pedunculo brevior. Pedicelli 2 mm. longi, basi bracteati et in medio minute bibracteolati. Sepala 2 dentibus productis in utroque latere munita, patentia. Corolla virenti-lutea (“greenish-yellow”), 9 mm. longa, extus sub-glabra. Filamenta 2 mm. longa, ciliata ; antherae 1 mm. longae, apice pilis paucis terminatae. Stylus cum stigmate capitato 2 mm. longus.

SOUTHERN RHODESIA : Distr. Inyanga, Inyangombi River above Nyamziwa Falls, 2,000 m., 18.I.1948, climber to 3 ft. h. (*N. C. Chase* n. 590—Gov. Hb. Salisb. n. 19891, Wien).

A *Cyphia mazoensi* S. Moore haec species differt imprimis corolla non tubulosa, pedunculis plerumque bi- et trifloris, tubo antherarum in dorso glabro, apice tantum pilis paucis ciliatae.

7. *Cyphia crenata* W. var. *smithiae* (L. Bolus) E. Wimm. comb. nov. —*C. Smithiae* L. Bolus in Journ. of Bot. LXVIII (1930) 78.

Caulis tenuis, volubilis, ramosus, glaber, foliatus. Folia elongato-triangularia, in quadrante inferiore latissima, versus apicem sensim angustata et acuta, basin versus late cuneata et in petiolum 4–6 mm. longum attenuata, 3 × 0.7–1.5 cm., margine crenulata, sed in parte patissima uno dente protracto (2–1 mm.) munita, glabra, tenuia ; summa folia paulatim ovato-lanceolata sine dente protracto, 2.5 × 0.4 cm. Flores in racemos laxos. Pedunculi plerumque biflori, rarissime 1-flori, in axillis bractearum lanceolarum, floribus longiorum vel parum breviorum. Pedunculus communis brevissimus (1–2 mm.), sed si 1 florem tantum gerit, tunc 8 mm. longus et basi bibracteolatus ; pedicelli 5–7 mm. longi, basi una bractea suffulti, plerumque ebracteolati, puberuli. Calycis tubus brevissime turbinatus vel nullus ; sepala anguste triangularia, integerrima, erecta, glabra, 3 mm. longa. Corolla 9 mm. longa, glabra, bilabiata : lobi 2 liberi, lanceolati ; labium 3-fidum in medio connatum, partes liberae anguste lanceolatae deflexae, fere 4 mm. longae. Stamina 5 mm. longa : filamenta versus basin pubescentia ; antherae in dimidio inferiore dorsi pilosae, versus apicem autem glabrae. Stylus cum stigmate capitato pilosulo 4 mm. longus.

PORT NATAL (comm. *Poeppig*—Hb. Mus. Wien).

Cape Peninsula, W. of Karbonkelberg, near Hout Bay, flow. October (*Blanche H. Smith*—Hb. Bolus 18927, vidi in Herb. Kew.).

Nota. Nuperrime vidi in herb. Thunbergii specimen originale

Lobelia crenata Thb., quae *Cyphia crenata* Willd. est et e diagnosi tradita non recte cognoscenda est. *C. crenata typica* differt ab hac varietate tantum foliis angustioribus, apice obtusis et pedunculis plurimus bifloris ut etiam in specimine e Natal supra allato. Semina e specimine Thunbergii complanato-ovalia late alata 2 mm. longa.

A simili *Cyphia natalensi* differt foliis magis rhomboideo-triangularibus (non lanceolato-ovatis ut vulgo), crenatis (non serrulatis); pedunculis fere semper bifloris; calycis tubo fere bullo, sepalis exinde fere liberis, distincte linearibus (non ovato acuminatis).

8. *Cyphia aspergilloides* E. Wimm. sp. nov.

Caulis volubilis, teres, tenuiter striatus, glaber, sparse foliatus. Petioli 5–10 mm. longi, tenues, glabri. Lamina foliorum ovata usque ovato-lanceolata, 3–5 × 1–1.6 cm., basi subrotundata vel breviter subacuta, apice acuta acuminataque, margine ± adpresse dentata—dentes callosi, antrorsum versi—glabra, subtus nervi prominuli, venae planae et vix visibiles. Flores subumbellati in pedunculo 2–4 cm. longo, 2–5-floro, axillari. Folia fulcrantia aliis similia, sed minora, vel lanceolata. Pedicelli 2–5 mm. longi, puberuli, interdum iterum 2–3-flori, ebracteolati, bractea lineari suffulti. Calycis tubus late turbinatis, subglaber; sepala sublanceolata, ad basin parum angustiora, 4 mm. longa, minute denticulata, suberecta. Corolla bilabiata, 7 mm. longa, extus glabra: petala 2 libera linearia, 3 reliqua in labium trifidum coalita. Stamina 4 mm. longa: filamenta pubescentia; antherae in dorso pilosae. Stylus fere 4 mm. longus, stigmate capitato pilosulater minatus. Cetera non visa.

AUSTRO–AFRICA, regio orientalis: Prov. Natal, Karkloof, in fruticetis, 5,500 ft., 20.II.1895 (*R. Schlechter* n. 6834—Berl.).

Proxime accedit ad *Cyphiam corylifoliam* Harv., sed forma foliorum, pedunculo elongato, sepalis et corolla minore satis distare videtur. Phillips eam olim ad *Cyphiam corylifoliam* traxit.

9. *Cyphia glabra*, E. Wimm. sp. nov.

Glabra. Caulis volubilis, striatus, sparse foliatus. Petioli 5–7 mm. longi, validiusculi, divaricati. Lamina foliorum elliptica usque oblonga, 3–4 × 1.2–2.3 cm., basi subacuta, ad apicem obtusa vel acuta, margine adpresse dentata vel callose denticulata, costa subtus prominens, nervi laterales prominuli, venae inconspicuae, folia flores fulcrantia foliacea, sed multo minora. Flores in racemis laxis, solitarii in axillis foliorum circiter 1 cm. longorum. Pedicelli 5–6 mm. longi, glabri, paulo infra calycem 2 bracteolis oppositis praediti. Calycis tubus turbinatus, scabriusculus; sepala ovata, acuta, reflexa, vix 2 mm. longa et totidem fere in basi lata, integerrima. Corolla circiter 11 mm. longa, extus glabra, intus puberula. Stamina 5 mm. longa: filamenta pubescentia; antherae oblongae, in nervo dorsali pilosae. Stylus cum stigmate capitato pilosulo 4 mm. longus. Cetera non visa.

TRANSVAAL: In fruticetis prope Mokapano Poort, 4,700 ft., 31.I.1894 (*R. Schlechter* n. 4332—Berl.).

Specimen initio florationis collectum, floribus bene evolutis caret. Etiam hunc specimen a Phillipsio ad *Cyphiam corylifoliam* refertur, a qua multis notis distat.

10. *Cyphia peteriana* E. Wimm. sp. nov.

Radix tuberos subglobosos proferens. Caules volubiles, 1-2 m. longi et late vagantes, ramosi, foliosi, glabri. Petioli 1-3 cm. longi, glabri. Folia late cordato-ovata vel ovato-elliptica, $5-6 \times 4$, 4×2.5 cm., apice acuminata, basi cordata, truncata vel rotundata, margine argute serrato-dentata vel saepius denticulata tantum, glabra, subtus pallidiora, nervi laterales 5-6 utrinque. Flores solitarii in axillis foliorum ovato-lanceolatorum et multo minorum, versus apicem etiam racemum laxum formantes. Pedicelli circiter 5 mm. longi, puberuli vel glabrati, infra calycem vel versus medium bibracteolati. Hypanthium late turbinatum, puberulum vel glabratum; sepala linearia, 5-7 mm. longa, utrinque uni-dentata, glabra, patentia. Corolla pallide coerulea vel lilacina, 10 mm. longa, extus glabra, intus puberula, bilabiata: 2 lobi soluti lineares, labium trifidum lobis oblongis acutis. Stamina 5 mm. longa: filamenta pubescentia; antherae oblongae, in nervo dorsali pilosae. Stylus cum stigmate cupuliformi pilosulo 3 mm. longus. Fructum maturum non vidi.

TANGANYIKA TERRITORIUM: Landschaft Unyanyembe, Malongwe östlich von km. 729.5, 1,200 m., 8.I.1925 (*A. Peter* n. 34472, typ.); Landschaft Uyansi, Tschaya, Pori und ehemaliges Ackerland, 1,250 m. (*A. Peter* n. 34396—Berl.); Iringa (*H. Lynes* n. 1 h 123—Kew); Distr. Mangoni, Kazikazi, 4,100 ft. (*B. D. Burt* n. 5070—Kew).

Early horticulture and agriculture at the Cape.*—Although Miss Karsten has published a number of papers on South African succulent plants, particularly stemless *Mesembryanthemae*, she is perhaps better known for her researches in historical aspects of Cape botany. Her account of the life and work of Rudolf Marloth (*Succulenta*, **14**: 1932) was followed by an account of Thunberg's travels and botanical explorations in the Cape (*Journ. S. Afr. Bot.* **5**: 1939, **6**: 1940, **12**: 1946) and she has now produced a most excellent book giving an account of the early history of gardening, agriculture and botany in the land of her adoption.

The foreword, by Prof. Compton, points out that the Dutch colonization of the Cape began with a garden which was developed by the Dutch East India Company in order to provide fresh vegetables and fruit for the scurvy-ridden crews of its merchantmen. In a longish preface, the author notes that the general text falls naturally into the two parts into which it is divided. The first (pp. 1-66) deals with the establishment of the garden and the experimental growing of various European crops; the second with the later development of the garden and the extension of its purely utilitarian activities to include the cultivation of exotic plants and native plants brought in by the early botanical (and other) explorers of the hinterland from the aesthetic and scientific points of view.

* "The Old Company's Garden at the Cape and its Superintendents" by Mia C. Karsten, F.R.H.S. with a foreword by Prof. R. H. Compton, M.A., F.R.S.S. Af., Director of the National Botanic Gardens, Kirstenbosch. pp. xvii + 188, 33 phot. plates. Maskew Miller, Ltd., Cape Town, 1951. 21s.

Part I is a well documented factual statement concerning the garden under the direction of Jan van Riebeeck (1652–1662), but Miss Karsten has the happy facility of being able to choose exactly right passages from the original diaries and archives to enable the reader to appreciate the heartbreak of the early gardeners when new crops nearing maturity were destroyed by storm and flood or devastated by invasions of native cattle, and also the simple joys experienced when the first fruits of their labours were safely harvested. Part II (pp. 69–154), remains well documented, is full of quotations from relevant manuscripts and contains numerous references to the early botanical explorers, often giving indications of the whereabouts of their herbaria. The period dealt with covers the long governance of Simon van der Stel (1679–1699) and his son W. A. van der Stel (1699–) and the superintendence of Oldenland and Hartog. Miss Karsten has little information relative to the intervening years 1662–1679.

The final chapter is devoted to the period of Superintendent Auge, who was first appointed to the garden in 1747 and became superintendent under Governor Rijk Tulbagh some years later.

The book concludes with two appendices—a summary of indigenous plants mentioned in van Riebeeck's journal (pp. 155–157) and an account (by S. J. van Ootstroom) of some drawings of *Proteaceae* ascribed to Jan Hartog and preserved in the government herbarium at Leyden (pp. 158–164)—an addendum (pp. 165–166) concerning Ootstroom's paper "On an 18th century oilpainting of botanical interest" published in *Blumea*, Suppl. III (1946), pp. 120–121, 1 plate, and an addendum (pp. 167–168) concerning George Meister's connection with the garden. The very useful bibliography covers pages 169–176, and there is an index of personal names followed by an index of plant names. The photographic illustrations include a varied assemblage of old maps and diagrams, portraits, herbarium specimens, plant drawings, title pages of old books, etc. The relevance of some of these seems (to the writer) a little doubtful; the quality of reproduction, though not always of the highest standard, is adequate. The documentation is extremely accurate and I have not observed a single statement of fact unsupported by reference to contemporary literature or manuscripts. It is, however, often difficult to determine dates of official periods of office ; thus I cannot quickly find in the text the date of retirement of the younger Van der Stel from the governorship, nor the date of Auge's appointment as Superintendent of the garden.

Miss Karsten is to be congratulated on this book, which represents a prodigious research into the early manuscripts ; it is not very "readable" since there is no connected narrative ; but it is a mine of information culled from numerous generally inaccessible sources concerning the early history of Cape botany and the personalities who unearthed our first knowledge of the amazing richness and beauty of the Cape flora.

A. A. BULLOCK.

REVISION OF THE "FLORA OF WEST TROPICAL AFRICA"

—I.

R. W. J. KEAY.

The Secretary of State for the Colonies, on behalf of the four British West African territories (Nigeria, Gold Coast, Sierra Leone and Gambia), and with the advice of the Director of the Royal Botanic Gardens, Kew, has arranged for the preparation of a revised edition of the "Flora of West Tropical Africa" by Dr. J. Hutchinson and Dr. J. M. Dalziel. Volume I, part I of this well known work was published in 1927 and the last part (Volume II, part II) in 1936. Stocks of complete sets are now exhausted and it is generally agreed that the preparation of a revised second edition is the only satisfactory way of meeting the increasing demand for an up-to-date flora in West Africa.

Of the original authors, Dr. Dalziel died in 1948 and Dr. Hutchinson retired from the staff of the Royal Botanic Gardens, Kew, in the same year. Unfortunately owing to heavy commitments on the preparation of a Flora of Tropical East Africa it was quite impossible for the Director to spare a member of the Kew staff for the work of revising the West African publication, though the staff of the Herbarium are willingly giving such aid as they can. The Government of Nigeria has therefore agreed with the suggestion made by the Secretary of State and the Director, that I should be attached to the Royal Botanic Gardens, Kew, for a period of about two years, for the purpose of preparing a revision of the "Flora of West Tropical Africa". The cost of this revision is being shared by the four British West African Governments.

Dr. Hutchinson, although retired, is still frequently in the Herbarium and has kindly agreed to advise on various points.

New species and new combinations will be published prior to the Flora in the Kew Bulletin in a series of papers of which this is the first. Important name changes and corrections will also be published in this series.

The following abbreviations for herbaria will be used :—

K = Royal Botanic Gardens, Kew.

BM = British Museum (Natural History).

FHO = Forest Herbarium, Department of Botany, University of Oxford.

OXF = Fielding Herbarium, Department of Botany, University of Oxford.

FHI = Forest Herbarium, Forest Department, Ibadan, Nigeria.

P = Paris.

B = Brussels.

"The Flora of West Tropical Africa" will be referred to throughout this series as F.W.T.A., and the "Flora of Tropical Africa" as F.T.A.

ANNONACEAE

4

Artabotrys coccineus Keay sp. nov., affinis *A. crassipetalo* Pellegrin, sed foliis membranaceis minoribus, sepalis petalisque angustioribus, stylis dense pilosis, differt.

Frutex scandens ramulis novellis dense ferrugineo-pilosis, adultis sparse pilosis cortice fusciscente obtectis. *Folia* petiolo 2-5 mm. longo sparse piloso supra canaliculato; laminae juveniles dense ferrugineo-pilosae mox glabrescentes, adultae membranaceae supra glabrae in sicco pallide viridescentes, subtus praeter costam sparse adpressequ pilosam glabrae, oblongo-ellipticae vel oblongo-obovatae basi acutae apice plus minusve subito acuminatae, 5-13 cm. longae, 2.5-6 cm. latae; nervi laterales primarii utrinsecus mediani 4-8 arcuato-adscendentes sub marginem laeviter revolutum anastomosantes et conjuncti, cum rete venularum utrinque prominuli. *Pedunculi* uniflori vel pauciflori, hamati, sparse adpressequ pilosi, 1-1.5 cm. longi, pedicellis more pedunculi vestitis, 4-8 mm. longis, apice laeviter incrassatis. *Sepala* 3, ovato-triangularia, circa 4 mm. longa et lata, recurvata, glabra vel sparse adpressequ puberula. *Petala* dense adpressequ puberula, crasse coriacea; externa 3, partibus inferioribus ovato-triangularibus 5 mm. longis 6 mm. latis, partibus superioribus lanceolatis extra costulatis insigniter incurvatis apice acutis circiter 15 mm. longis basi 4-4.5 mm. latis; interna 3, partibus inferioribus rhomboideis 7 mm. longis et latis extra costulatis, intus basi concavis, super genitalia incrassatis inter se ante anthesin coalitis partibus superioribus lineari-lanceolatis erectis, circiter 11 mm. longis, basi vix 1.5 mm. latis, medio 3 mm. latis, extra costulatis. *Stamina* numerosa circiter 1.5 mm. longa, connectivo apice peltato, glabra. *Carpella* circiter 14, oblonga, tetragona, 1.2 mm. longa, praecipue ad angulos puberula, stylo ovato 0.6 mm. longo dense piloso instructa. *Fructus* pedunculo lignoso circiter 5 mm. longo, sepalis persistentibus, toro circiter 8 mm. diametro praeditus; monocarpia circiter 8-10, sessila, ellipsoidea vel obovoidea apice distincte rostrata, 19-21 mm. longa, 9-12 mm. lata, glabra, in vivo lucida coccinea, utroque seminis duobus magnis praedito.

NIGERIA: Oyo Province, Ibadan South Forest Reserve; edge of high forest with cacao farm, near a seasonal stream, 17 Jan. 1949, *Keay* FHI. 19799 (K.; FHI.): climber with brilliant scarlet fruits. Same locality; in climber tangle by stumps of large dead *Brachystegia* in forest, 26 Sept. 1950, *Keay* FHI. 28041 (typus in Herb. Kew.; FHI.): small liane, young flowers yellow-green. Calabar Province, Oban, *Talbot* 1322 (BM.).

Although Pellegrin (Bull. Soc. Bot. Fr. **94**: 257 (1947)) described the leaves of *A. crassipetalus* as "papyracea", the leaves in the syntype (*Le Testu* 8000) which I have seen are definitely rather thick and coriaceous. The membranous leaves of the new species are distinct from those of *crassipetalus* in size, and in number of nerves as well as in texture. The flowers of the new species although not quite mature are more delicate than in *crassipetalus*, but of the same general shape. In *Talbot* 1322 the flowers, such as they are, appear mature but are no bigger than in my specimen. Other floral characters which distinguish *A. coccineus* are the more numerous carpels with densely pilose styles, and the lower portion of the inner petals which is concave and relatively thin at the level of the stamens but very thick above where it covers the stamens and carpels.

The description and measurements of the flowers and fruits were made from preserved material. The description of the fruit is based on *Keay* FHI. 19799 (K.).

Uvariastrum elliotianum (*Engl. et Diels*) *Sprague et Hutch.* in Kew Bull. 1916 : 159.

Uvaria elliotiana Engl. et Diels in Monogr. Afr. Pfl. Annonac. 28 (1901).

Examination of the material at Kew of this West African species indicates that there are at least two entities distinct from the typical species. Both these entities have been noted in MS. as new species but, I consider, are best treated as varieties. They are :—

Uvariastrum elliotianum (*Engl. et Diels*) *Sprague et Hutch.* var. **sericeum** *Keay* var. nov. ; a typo differt foliis dure coriaceis sensim longe acuminatis dense sericeis in statu juvenilo, petalis longioribus.

FRENCH GUINEA : Environs de Kindia, May 1934, *Jacques-Felix* 465 (K. ; P.) : petit arbre de la galerie forestiere.

SIERRA LEONE : Njala, river bank, 10 Feb. 1927, *Deighton* 510 (typus varietatis in Herb. Kew.) : bush 5 m. high, white flowers ; old leaves lose their hairs and become hard and are used for cleaning caps and other cloth articles. Same locality, 8 July 1935, *Deighton* 3015 (K.) : fruit nearly ripe ; white flowers.

Uvariastrum elliotianum (*Engl. et Diels*) *Sprague et Hutch.* var. **glabrum** *Keay* var. nov. ; a typo differt foliis chartaceis supra glabris subtus sparsissime pubescentis glabrescentis, pedicellis sepalisque sparse pubescentis.

GOLD COAST : Kwahu Prasu, 230 m. alt., undergrowth in closed forest, Feb. 1929, *Vigne* FH. 1628 (K. ; FHO.) : shrub 4 m. high, white flowers. Atewa Range, Eastern Province, 300 m. alt., Feb. 1937, *Vigne* FH. 4336 (typus varietatis in Herb. Kew.) : small tree 6 m. high and 30 cm. girth, white flowers. South Fomang Su Reserve, 230 m. alt., undergrowth in forest, Jan. 1933, *Vigne* FH. 2679 (FHO.) : small tree 6 m. high, 30 cm. girth, white flowers.

The type of *U. elliotianum* var. *elliotianum* is *Scott Elliot* 4855 from Mount Gonkwi, Dunnia, Talla Hills, Sierra Leone ; the holotype is at Kew, together with *Rowland* s.n. (from Lagos) also cited and identified by Engler himself. The typical plant is also recorded from the Gold Coast (*Vigne* 1689 ! 1977 ! 3893 !) and from Northern Nigeria (*Dalziel* 761 !).

The typical plant and the two new varieties may be distinguished by the following key :—

Leaves more or less coriaceous, pubescent on the midrib above, even in mature leaves ; pedicels and sepals densely pilose :

Leaves very thick, densely brown silky when young, lanceolate-elliptic, gradually long acuminate, 12–24 cm. long, 4–7 cm. broad ; petals 18 mm. long var. *sericeum*

Leaves somewhat thinner and less densely hairy, obovate-elliptic, rather abruptly acuminate, 8–20 cm. long, 2.5–6 cm. broad ; petals 14–16 mm. long var. *elliotianum*

Leaves chartaceous, almost glabrous from youth, midrib above glabrous ; pedicels and sepals thinly pubescent ; otherwise as var. *elliotianum* var. *glabrum*

Uvariopsis globiflora Keay sp. nov., affinis *U. congoensis* Robyns et Ghesquiere sed foliis majoribus, floribus majoribus, petalis suborbicularis differt.

Arbor parva, usque 7 m. alta, vel frutex. Ramuli novelli nigrescentes sparse puberuli, adulti glabri cortice rimoso fuscescente obtecti. *Folia* petiolo 2–3 mm. longo, 1.5–2 mm. diametro, incrassato nigrescente glabro; laminae juveniles dense puberulae mox glabrescentes, in sicco nigrescentes, adultae papyraceae supra glabrae nitidulae, in sicco pallide viridescentes, subtus praeter costam sparsissime puberulam glabrae, oblongae vel oblongo-ob lanceolatae, basi rotundatae vel obtusae, apice versim acuminatae vel acutae, 12–23 cm. longae, 3.5–8.5 cm. latae; nervi laterales primarii utrinsecus mediani 9–15 arcuato-adscedentes sub marginem anastomosantes et conjuncti; nervi laterales secundarii nonnullae, cum primariis subtus prominentes supra prominuli. *Flores* monoeci, solitarii vel ternati; pedunculi incrassati brevissimi bracteolis duabus ciliolatis instructi; flores ♂ et ♀ extrinsecus similes in ramis foliosis axillares, pedunculis 5–35 mm. longis sparse et adpresse pilosis; alabastra sphaerica; calyces disciformes vel vix bilobati, 5–6 mm. in diametro, extra adpresse fulvo-pilosi; petala lutea suborbicularia incrassata extra primum fulvo-puberula deinde praeter basi sparse puberuli glabrescentia, intus verrucosa pilosaeque, 9–12 mm. in diametro. *Flores* ♂ torus staminis additis subsphaericus, circiter 2.5 mm. in diametro; stamina numerosissima circiter 0.5 mm. longa, antheris sessilibus. *Flores* ♀ torus carpellis additis hemisphaericus, circiter 4.5 mm. in diametro; carpella circiter 20, oblonga tetragona, dense sericeo-pilosa, circiter 2 mm. longa et 1 mm. lata. *Fructus* pedunculo incrassato 3–4 cm. longo, toro heniisphaerico 6–10 mm. lato; monocarpia circiter 6, distincte stipitata, stipis circiter 3 mm. longis, plus minusve subcylindrica vel obovoidea inter semina constricta, plerumque sectione inferiore quam aliis minore, statu maturo 2–4 cm. longa et 1.2–1.7 cm. lata, in sicco extra rubro-fuscescentia minute rugoso-tuberculosa, praeter apicem sparse puberulum glabra; semina 2–8 biseriata.

GOLD COAST: Amentia, alt. 156 m., March 1930, *Vigne* FH. 1877 (typus in Herb. Kew.): shrub 2 m. high in undergrowth of closed forest, flowers have 4 very fleshy valvate yellow petals and 2 sepals, unisexual, the mature flowers are 3.7 cm. diam. Bobiri Forest Reserve, Jan. 1948, *Andoh* FH. 5098 (FHO.): a small tree with spreading crown. South Fomang Su Forest Reserve, Oct. 1936, *Andoh* FH. 4246 (K.): a small tree 7 m. high and 30 cm. girth, common.

In *Uvariopsis congoensis* Robyns & Ghesquiere (Ann. Soc. Sci. Brux. 53: 317 (1933)) the female flowers are described as occurring on the leafy shoots as well as on the older woody branches and bole. In *Vigne* FH. 1877 and *Andoh* FH. 4246 and FH. 5096 the female flowers and fruits are borne on leafy branches and the collectors make no mention of the tree being cauliflorous. It is however possible that cauliflory may occur in *U. globiflora* as it does in *U. congoensis*. The description of the fruit is based on *Andoh* FH. 5098 (FHO.).

Uvariopsis guineensis Keay nom. nov.

Uvaria spectabilis A. Chev. ex Hutch. et Dalz. F.W.T.A. 1: 50 (1927); A. Chev. Explor. Bot. 7 (1920)—*nomen nudum*; non *Uvaria spectabilis* DC. Syst. 1: 484 (1818).

Uvaria spectabilis A. Chev. ex Hutch. et Dalz. was described without flowers ; it appears, however, with little doubt to be a *Uvariopsis*. The fruits have stout pedicels 6·5 cm. long, with sessile glabrous monocarps up to 4·5 cm. long, and Chevalier, on his specimen No. 21305 from Dyolas, Ivory Coast, collected in April 1908, notes that the bunches of fruit are borne on the trunk at ground level.

The leaves of Chevalier's specimens resemble *Vigne* FH. 1877 and the other specimens upon which I have based *Uvariopsis globiflora* Keay. The latter specimens have in fact been named *Uvaria spectabilis* A. Chev. ex Hutch. et Dalz. by Dr. Hutchinson himself. The most obvious difference between *U. guineensis* and *U. globiflora* is the habit of cauliflory ("trunciflorie" and/or "basiflorie") in the former.

A specimen recently collected in Sierra Leone appears very probably to be the flowering state of *U. guineensis* and if this is so, the floral differences between this species and *U. globiflora* are well marked and not just a matter of cauliflory. In this flowering specimen (*Small* 101 from Dambaye Valley, Kenema) the only inflorescence is a cauliflorous fascicle with two mature male flowers and three very young buds. The mature flowers are on stout glabrous pedicels 2 cm. long, thickened towards the top reaching 4 mm. in diameter. The calyx has split into 2 lobes and is 11–12 mm. in diameter. The petals are fleshy and up to 5–6 mm. thick, they are united at the base for a distance of 5–7 mm., and are glabrous and shining without and verrucose within. In shape the petals are ovate-triangular, 18–20 mm. long and 14–17 mm. broad. The androecium is about 5 mm. in diameter. This description is based on material preserved in spirit. In *U. globiflora* the flowers are smaller, the petals suborbicular and completely free from each other.

I refer the following specimens to *Uvariopsis guineensis* Keay, and give the collectors' notes in full :—

FRENCH GUINEA : Fassakoidou, 24 Feb. 1909, *Chevalier* 20797 (K. ; P.).

SIERRA LEONE : Gola Forest, Jan. 1909, *Unwin & Smythe* 51 (K.) : small tree bearing glabrous red fruits on main stem ; fruits variable in shape. Dambaye Valley, Kenema, 25 May 1951, *Small* 101 (K.) : small tree under dense canopy in unopened high forest ; flower with 4 petals, fleshy, and cauliflorous.

LIBERIA : Gbanga, 12 Sept. 1926, *Linder* 580 (K. ; Arn. Arb.) : tree 15–20 ft. high in original forest ; flowers cauliflorous, corolla 4-parted, thick, green outside, yellowish within ; stamens in dense mass, brownish. [The Kew specimen has no flowers.]*

IVORY COAST : Dyolas, Haute-Cavally, 25 April 1909, *Chevalier* 21305 (typus in Herb. Paris) : grappes de fruits sur le tronc au ras du sol.

Uvariopsis bakeriana (Hutch. et Dalz.) Robyns et Ghesquiere in Ann. Soc. Sci. Brux. **53** : 320 (1933).

Tetraslemma bakerianum Hutch. et Dalz. in Kew. Bull. **1927** : 153 (1927), et F.W.T.A. **1** : 57 (1927).

* Through the courtesy of the Curator, Arnold Arboretum, Harvard University. I have since been able to examine the original flowering specimens. The flowers (♂ and ♀), being dried, are a little smaller than in *Small* 101 but agree perfectly in essential characters.—R.W.J.K.

This species was described by Hutchinson and Dalziel as dioecious, but specimens and field observations made by my colleague Mr. J. P. M. Brenan in the British Cameroons prove that the species is, or at any rate can be, monoecious. Additional gatherings (with full collecting notes) of this remarkable species are:—

NIGERIA : Oban, between Obutong and Mfamoseng, 15 March 1945, *MacElderry* FHI. 7737 (FHI. ; O.) : small tree near stream, cauliflorous, fruits bright red.

BRITISH CAMEROONS : Kumba Division, Southern Bakundu Forest Reserve, about 1.5 km. west of Bopo village, 12 March 1948, *Richards & Onochie* 9305 (K.) : in low marshy land by a small stream, common with *Chrysophyllum laurentii* ; shrub up to 6 m. high and stem diameter of 5 cm., dark brown stem with aromatic slash ; leaves coriaceous, deep green above, glaucous beneath ; petals dark blood red ; fruit red. Same locality, 13 March 1948, *Brenan* 9409 (K.) : in high forest in swampy ground by stream in bottom of a rather deep gully, not uncommon here but not seen elsewhere ; small tree, sometimes leaning, to 5 m. ; twigs brown tomentellous when young then brownish-black ; leaves coriaceous deep green and glossy above, slightly raised between the lateral nerves, midrib narrowly impressed, pale green beneath, midrib prominent and rounded lateral nerves and venation obscure, not raised, slightly darker green than rest of surface ; flowers borne singly or in few flowered fascicles on the trunk from the base upwards, none on the leafy twigs ; pedicels green with brown indumentum : petals 4 making buds \pm tetragonal, dull brown outside in bud, pinkish-brown outside in flower, inside deep rosy-mauve, muricate, arcuate or recurved in upper part, ♀ with 12 carpels, ♂ with a column of numerous minute whitish anthers.

FRENCH CAMEROONS : Bipinde, *Zenker* 3971 (K.) : leaves only.

Uvariopsis dioica (*Diels*) *Robyns et Ghesquiere* l.c. 321.

Tetrastemma dioicum Diels in Engl. Bot. Jahrb. **38** : 241 (1906), et **39** : 475 t, 1, A-K. (1907).

Tetrastemma pedunculosum Diels in Engl. Bot. Jahrb. **53** : 441 (1915).

Uvariopsis pedunculosa (*Diels*) *Robyns et Ghesquiere* l.c. 321.

The characters which have been used to separate *U. dioica* and *U. pedunculosa* do not appear to be valid. *U. dioica* was, like *U. bakeriana* (see above), said to be dioecious, but *Mildbraed* 10647 from Bibundi in the British Cameroons, which has been named *U. dioica* in the Berlin Herbarium and by Prof. Robyns, has both male and female flowers in the same fascicle. The length of the peduncle on the female flowers seems to vary considerably, at least in the trees I have seen in the forest at Sapoba, Nigeria ; peduncles of 4–5 cm. long were seen on the same tree as peduncles of about 15 cm. The other character—bilobed calyx in *pedunculosa* and patelliform calyx in *dioica* used by Robyns and Ghesquiere also seems to be variable on single plants, the patelliform calyx splitting to become bilobed.

The specimen I collected in Nigeria and have identified as *U. dioica* was certainly monoecious with the male flowers predominating in the fascicles well above the ground, and the female flowers mainly concentrated at the base of the bole.

I do not therefore consider that too much importance should be attached to the supposedly dioecious habit which has been attributed to this and certain other species of *Uvariopsis*.

The following additional gatherings (with full field notes) are referred to *U. dioica* (Diels) Robyns et Ghesquiere (= *U. pedunculosa*).

NIGERIA : Sapoba, 26 Oct. 1934, *A. F. Ross* 216 (K. ; FHI.) : small tree up to 5 cm. girth ; flowers clustered on hard woody nobs on main stem, most numerous at ground level, pedicels up to 10 cm. long. Same locality, 5 March 1935, *Kennedy* 2573 (FHO.) : small cauliflorous tree, 4 m. high, in dense shade ; fruits bright red. Same locality, 3 Nov. 1950, *Keay* FHI. 28066 (K. ; FHI.) : in high forest with *Lovoa* and *Piptadenia* ; understorey tree to 8 m. high, cauliflorous ; flowers very dense at ground level, sparse higher up the bole, reaching up to about 3 m. ; pedicel, calyx and petals outside crimson, anthers and inside of petals pale yellow ; fruiting carpels crimson becoming dirty brown, pedicels variable in length, very long near the ground.

The four species of *Uvariopsis* known to occur in the F.W.T.A. area, and referred to above, may be distinguished by the following key :—

Flower buds elongate, tetragonal in section ; petals 1·5–3 cm. long, linear-lanceolate ; flowers solitary or in few flowered fascicles on the bole ; fruiting carpels lobulate, 5·5 cm. long, 2 cm. broad

bakeriana

Flower buds globose or ovoid-conical ; petals suborbicular to ovate :

Flowers solitary, or up to 3 together, axillary on leafy shoots ; buds globose ; petals suborbicular, 9–12 mm. diam. ; fruiting carpels shortly stipitate, subcylindrical to obovoid, constricted between the seeds *globiflora*

Flowers in fascicles on the bole :

Flower buds depressed globose, petals (♂) ovate-triangular, 18–20 mm. long, 14–17 mm. broad, very fleshy and up to 6 mm. thick, connate for 5–7 mm. at base ; ♀ flowers not known ; fruiting carpels sessile, subcylindrical to obovoid, constricted between the seeds *guineensis*

Flower buds ovoid-conical ; petals ovate, ♀ up to 25 mm. long and 15 mm. broad, ♂ 8–13 mm. long, 5–7 mm. broad, up to 2 mm. thick ; pedicels up to 18 cm. long in ♀ flower ; fruiting carpels almost sessile, subglobose to cylindrical, not constricted between the seeds *dioica*

Isolona maitlandii Keay sp. nov., affinis *I. heinsenii* Engl. et Diels sed floribus extra et pedicellis glabris, tubo corollae majore basi dilatato, lobis corollae latioribus differt.

Arbor ramulis novellis dense argenteo-puberulis, adultis nigrescentibus sparse puberulis. *Folia* petiolo 4–5 mm. longo sparse puberulo ; laminae juveniles dense argenteo-puberulae, adultae papyraceae supra praeter costam puberulam fere glabrae, subtus praecipue ad nervos sparse puberulae, elongato-oblongae vel oblongo-oblancoolatae, basi acutae, apice sensim acuminatae, 13–19 cm. longae, 3·5–5·5 cm. latae ; nervi laterales primarii 13–18 juga arcuato-adscendentes marginem versus anastomosantes et conjuncti, utrinque prominuli, rete venularum vix

conspicuum. *Flores* axillares solitarii, pedunculis 1-2 mm. longis minute 3-5 bracteatis, pedicellis 12-18 mm. longis e ramulis adultis orti. *Calyx* 3-lobus 2-3 mm. diametro, lobis late triangularibus; petala 6 in corollam connata; parte inferiore subglobosa 4 mm. longa 5 mm. lata intus pilosa extra glabra apicem versus constricta; parte superiore infundibuliformi 4-7 mm. longa glabra; lobis liberis lanceolatis 14-18 mm. longis, basi 4-7 mm. latis, glabris apice obtusis. *Stamina* numerosa 0.8 mm. longa. *Carpella* circiter 6, connata in ovarium glabrum conicum 2 mm. longum, basi 1 mm. latum; stigmata minutissima. *Fructus* ignotus.

BRITISH CAMEROONS: Bamenda Province, Ngong, alt. 950 m., June 1931, *Maitland* 1555 (typus in Herb. Kew.; FHO.): forest tree. Bamenda Province, Wae, alt. 1,100 m. April 1931, *Maitland* 1596 (K.; FHO.): forest tree.

This species is clearly related to *I. heinsenii* Engl. et Diels of the Usambara Mountains in Tanganyika, which in leaf shape and general appearance it closely resembles. The flowers however are glabrous outside and rather larger, with the lower part of the corolla globose and separated from the upper funnel-like part by a marked constriction. The indumentum of the young shoots and leaves is rather shorter and closer in *I. maitlandii* than in the East African species.

Isolona deightonii Keay sp. nov., ab *I. congolana* (De Wild. et Th. Dur.) Engl. et Diels et *I. pilosa* Diels floribus multo majoribus sepalis foliosis differt; ab *I. congolanae* ramulis adultis dense pilosis, pedicellis brevioribus, et ab *I. pilosa* foliis minoribus differt.

Arbor parva, usque 5 m. alta, vel frutex. *Ramuli* dense ferrugineo-pilosi. *Folia* petiolo 2-6 mm. longo dense ferrugineo-piloso; laminae papyraceae supra praeter costam hispidam fere glabrae subtus praecipue ad nervos pilosae, elongato-obovatae vel sublanceolatae, basi acutae vel obtusae apice acuminatae, 12-18 cm. longae, 3.5-6 cm. latae; nervi laterales primarii utrinque 8-10 arcuato-ascendentes supra insculpti subtus cum venulis prominentes. *Flores* axillares solitarii pedicellis 5-8 mm. longis. *Sepala* 3 ovata extra hispida 14 mm. longa, 9-10 mm. lata; petala 6, in corollam connata; parte tubulata inferiore dense pilosa 5 mm. longa, 5 mm. lata; parte superiore infundibuliformi sparse pilosa 7-10 mm. longa; lobis liberis triangularibus sparse pilosis, 11-15 mm. longis, basi 8-10 mm. latis, apice acutis vel obtusis. *Stamina* filamentis brevibus praedita, 1.2 mm. longa; connectivum apice sparse pilosum. *Carpella* circiter 6, connata in ovarium 1.8 mm. longum; stigmata incrassata 0.6 mm. longa, 1 mm. diametro. *Fructus* campanulato-ellipsoideus costulatus glaber, 6 cm. longus, 4 cm. latus, 1.8 cm. crassus.

SIERRA LEONE: Jama, 22 Sept. 1935, *Deighton* 3072 (K.): climber (?), fruit edible, yellowish. Near Kongohun, 6 June 1939, *Deighton* 3675 (K.): tree 5 m. high, in high bush, green flowers. Daru, Tunkia, 8 March 1945, *Deighton* 4112 (typus in Herb. Kew.): tree 5 m. high in forest, green flowers.

VERNACULAR NAME: *Kpende-golei* (Mende) *fide* Deighton.

I. deightonii has no very close affinity, though it is remarkable in the genus on account of its dense indumentum which immediately puts it in

the same group as *I. congolana* (De Wild. et Th. Dur.) Engl. et Diels, *I. pilosa* Diels and *I. heinsenii* Engl. et Diels. From all these species, however, it differs in its much larger corolla and remarkable foliaceous sepals. The fruits of *I. deightonii* (description based on *Deighton* 3071) and *I. congolana* (as judged by *Eggling* 4055 from Uganda, identified at the Herbarium, Jardin Botanique, Bruxelles) are rather similar in shape and appearance, being longitudinally ridged and scarcely lobulate.

In searching for the affinity of *I. deightonii* I was, through the courtesy of the Director of the Berlin Herbarium, able to borrow *Ledermann* 11, the holotype of *I. pilosa* Diels. *Boutique* in *Fl. Congo Belge* 2 : 261 (1951) suggested that *I. pilosa*, known to him only by the description, might be a more pubescent form of *I. congolana*. Judging, however, by *Eggling* 4055 and the description, it is evident that *I. congolana* has a constantly narrower leaf than *I. pilosa*, as well as much shorter and sparser indumentum.

The sheet of *Ledermann* 11 has only one flower and it is rather smaller than the measurements given by Diels in his description. This flower is in fact even a little smaller than those of *Gossweiler* 9063, syntype of *I. theobromina* Exell (*Journ. Bot.* 64, Suppl. Polypet. : 10 (1929)), a species described as differing from *pilosa* in its smaller flowers. The corolla lobes of *Ledermann* 11 are definitely shorter and more triangular than in *Gossweiler* 9063 where they are lanceolate. In all other respects *I. pilosa* Diels and *I. theobromina* Exell are extremely close, and may well prove conspecific.

***Isolona pleurocarpa* Diels subsp. *nigerica* Keay, subsp. nov. ; a typo differt lobis corollae dimidio brevioribus.**

NIGERIA : Ijebu Ode Province, Shasha Forest Reserve, secondary forest near stream, 8 April 1935, *Richards* 3343 (typus subspeciei in Herb. Brit. Mus.) : tree 17 m. high, 15 m. to first branch, 1.7 m. girth, perianth green ; fruit dark brown. Benin Province, Sept. *Kennedy* 1568 (FHO., BM.).

The leaves of this new subspecies are very similar to those of *Zenker* 3217 from the French Cameroons, type of *I. pleurocarpa* Diels in Engl. Bot. Jahrb. 39 : 485 (1907), a species described without flowers. The fruit of the Nigerian material also appears to be the same as in *I. pleurocarpa*. Four later gatherings by *Zenker* (3433, 3540, 3921 and 4704), duplicates of which are preserved at Kew and the British Museum, have been named *I. pleurocarpa* by Diels and have good flowers. These flowers are similar to the Nigerian material in the shape and size of the corolla tube, but have much longer lobes measuring 20–22 mm. long and up to 6 mm. broad. In the Nigerian material the corolla lobes are almost as broad and are similarly rounded at the apex, but are only 8–11 mm. long ; the corolla tube, both in the typical plant and in the subspecies, is about 8 mm. long.

HERNANDIACEAE

***Illigera vespertilio* (Benth.) Bak. f.**

E. G. Baker in the *Journal of Botany* 63 : 175 (1925) drew attention to the fact that *Dioscorea vespertilio* Benth. is a species of *Illigera* Blume. The species was described by Benthham in W. J. Hooker's *Niger Flora* p. 538 (1849) and is based on a single specimen in leaf, with a few loose

fruits, collected in Sierra Leone by G. Don. Baker regarded this type specimen as undoubtedly *Illigera pentaphylla* Welw. (in Trans. Linn. Soc. **27** : 26 (1869)), thus making *I. pentaphylla* Welw. a synonym of *I. vespertilio* (Benth.) Bak. f.

Re-examination of the African specimens of *Illigera* at the British Museum and Kew herbaria has shown however that there are two clearly distinct species on the mainland of tropical Africa, and that Baker was certainly wrong in regarding Don's specimen of *I. vespertilio* as the same as *I. pentaphylla*. The two species may be distinguished as follows :—

Leaves 3-foliolate ; leaflets obovate, rounded or obtuse at the apex, obtuse to cuneate at the base ; with 1 (rarely 2) strong lateral nerve on each side of the midrib ; midrib sparsely hirsute on the underside near the base only ; lamina, petiolule and petiole otherwise glabrous *vespertilio*

Leaves normally 5-foliolate, but sometimes 3-foliolate in the inflorescence ; leaflets ovate, oblong-elliptic to ovate-lanceolate, acuminate at the apex with the acumen itself obtuse, obtuse, rounded or subcordate at the base ; with 2 (rarely 3) strong lateral nerves on each side of the midrib ; midrib, lateral nerves and veins sparingly hirsute on the underside, petiolules and petiole hirsute when young *pentaphylla*

Illigera vespertilio (Benth.) Bak. f. in Journ. Bot. **63** : 175 (1925), excl. syn. *I. pentaphylla* Welw. ; Hutch. et Dalz. F.W.T.A. **2** : 382, 605 (1936), excl. syn. *I. pentaphylla* Welw.

Dioscorea vespertilio Benth. in W. J. Hooker's Niger Flora p. 538 (1849).

SIERRA LEONE : Don s.n. (typus in Herb. Brit. Mus.).

LIBERIA : Gbanga (fl. Sept.) Linder 381 (K. ; Arn. Arb.).

FRENCH CAMEROONS : Bipinde Zenker 3573 (K., ex Herb. Berol.). [Originally determined, and cited by Sprague in F.T.A. **6**, **1** : 192 (1913), as *I. pentaphylla* Welw.].

I. pentaphylla Welw. in Trans. Linn. Soc. **27** : 26 (1869) : Sprague in F.T.A. **6**, **1** : 192 (1913) excl. spec. Zenker 3573 ; Hutch. et Dalz. F.W.T.A. **1** : 63 (1927).

I. vespertilio (non Benth.) Bak. f. in Journ. Bot. **63** : 175 (1925) quoad syn. *I. pentaphylla* Welw. ; Hutch. et Dalz. in F.W.T.A. **2** : 382, 605 (1936) quoad syn. *I. pentaphylla* Welw.

IVORY COAST : Recorded by Chevalier in Fl. Viv. **1** : 49 (1938), but I have not seen the specimens ; they may include *I. vespertilio* (Benth.) Bak. f.

GOLD COAST : Aburi Hills (fl. June) T. W. Brown 317 (K.). Sukyen (fr. June) H. N. Thompson 94 (K.).

NIGERIA : Benin Province, Okomu Forest Reserve, Brenan & Onochie 9000 (K.). Oyo Province, Ibadan North Forest Reserve (fl. Aug.), Ahmed & Chizea FHI. 20024 (K. ; FHI.).

BRITISH CAMEROONS : Buea, alt. 1000 m. (fl. May) Maitland 665 (K.).

FRENCH CAMEROONS : Yaunde Zenker 1426 (K., ex Herb. Berol.). Also in Spanish Guinea, Belgian Congo, Uganda and Angola (type of the species is Welwitsch 1753 from Angola).

ARISTOLOCHIACEAE

Pararistolochia Hutch. et Dalz.

Hutchinson and Dalziel (Kew Bull. **1928** : 22) distinguished their new genus from *Aristolochia* by, (1) the actinomorphic, more or less equally 3-lobed perianth limb, and (2) the remarkable cucumber-shaped indehiscent fruit which is longitudinally ribbed and transversely locellate. While examining the African species of the two genera for the revision of the F.W.T.A. it has become evident that two of the west African species left in *Aristolochia* by Hutchinson and Dalziel on account of their zygomorphic perianth-limbs have the long indehiscent fruit of *Pararistolochia* ; these species are *A. promissa* Mast. (= *A. flagellata* Stapf) and *A. mannii* Hook. f.

Schmidt in Engler & Prantl Nat. Pflanzenfamilien II **16 b** : 241 (1935) did not recognise *Pararistolochia* as a distinct genus but treated the species transferred to it, together with *A. promissa* and *A. mannii*, as the sub-genus *Pararistolochia* (Hutch. et Dalz.) Schmidt. The characters given by Schmidt, quite apart from the "alleged" indehiscent fruit ("angeblich nicht aufspringend") do however suggest a distinct genus. The further collections made since the description of *Pararistolochia* indicate that the species transferred to this genus, together with *A. promissa* and *A. mannii*, do in fact have long indehiscent cucumber-like fruits. Further, it is evident that these species are almost always lianes of dense forest with their flowers borne on the woody stems low down in the shade below the leaves which are mainly in the forest canopy. This habit contrasts with that of typical *Aristolochia* species whose flowers are normally borne with the leaves in the light. There appears to be an important biological difference therefore between *Pararistolochia* spp., with their flowers and long indehiscent fruits borne on old wood in the forest shade below the leaves, and *Aristolochia* spp., with their flowers and short dehiscent fruits (with wind-borne seeds) borne with the leaves in the light.

I consider therefore that the characters enumerated by Schmidt, together with the important and evidently constant fruit character, are sufficient grounds for maintaining *Pararistolochia* as a distinct genus. The regularly 3-lobed perianth limb described by Hutchinson and Dalziel is not, in my opinion, the important character. *A. siphon* L'Herit has the regularly 3-lobed perianth limb, but by its basket-like fruit and other characters it is clearly not a *Pararistolochia*.

The following new combinations and reductions are necessary :

Pararistolochia mannii (Hook. f.) Keay comb. nov.

Aristolochia mannii Hook. f. in Trans. Linn. Soc. **25** : 186 (1865) ; Baker et Wright in F.T.A. **6, 1** : 140 (1913) ; Hutch. et Dalz. F.W.T.A. **1** : 77 (1927).

S. NIGERIA : Old Calabar River (fl. Feb.) Mann 2323 (typus in Herb. Kew.). Old Calabar Thomson 69 (K.). Bonny (fl. & fr. Feb.) Kalbreyer 62 (K.).

Kalbreyer's gathering included a fruit which he described as "long with 8 corners". This fruit has been preserved in the Kew Museum and has six not eight corners and is clearly typical of *Pararistolochia*. The perianth in this species consists of a pouch about 2.5 cm. long and 1.5 cm.

broad, a slightly oblique tubular limb about 6 cm. long, and three short rounded unequal lobes. This species is closely allied to, but quite distinct from, *P. triactina* (Hook. f.) Hutch. et Dalz.

***Pararistolochia promissa* (Mast.) Keay comb. nov.**

Aristolochia promissa Mast. in Gard. Chron. **11** : 494 (1879) ; Baker et Wright in F.T.A. **6**, **1** : 142 (1913) ; Hutch. et Dalz. F.W.T.A. **1** : 78 (1927).

Aristolochia flagellata Stapf in Kew Bull. **1906** : 80 (1906) ; Baker et Wright l.c. 141 ; Hutch. et Dalz. l.c. 77.

Aristolochia talbotii S. Moore var. *longissima* S. Moore in Cat. Talb. Nig. Pl. 94 (1913).

Aristolochia congolana Hauman *nomen ad int.* in Fl. Congo Belge **1** : 384, t 38 (1949).

GOLD COAST : Aburi Hills (fl. Oct.) Johnson 487 (K.). Aburi Gardens (fl. Nov.) Johnson 1060 (typus in Herb. Kew., *A. flagellata* Stapf). Kwahu Prasu (fl. Feb.) Vigne 1606 b, 1607 (K.). Bunsu Akim (fl. Mar.) Irvine 1806 (K.).

NIGERIA : Oban Talbot 1642 (typus in Herb. Brit. Mus., *A. talbotii* var. *longissima*).

BRITISH CAMEROONS : Victoria (fl. Jan.) Kalbreyer 7 (typus in Herb. Kew.). Barombi (fl. Mar.) Preuss 45 (BM.).

FRENCH CAMEROONS : Between Yaunde and Dengdeng (fl. Mar.) Mildbraed 8468 (K.). Between Dengdeng and Lom (fl. Apr.) Mildbraed 8899 (K.). Kongola (fl. Apr.) Mildbraed 9035 (K.). Lom River (fl. May) Mildbraed 9196 (K.). Bitya, near River Ja, Bates 17775 (K.).

BELGIAN CONGO : Yangambi Louis 3226 ; 3977 (B.).

The leaf characters which have been used in attempts to separate *A. flagellata* from *P. promissa* do not seem to be of any value. Even Johnson 487, one of the specimens upon which Stapf based his *A. flagellata*, is described by the collector as having the leaves on the old wood, a character which Stapf assigns only to *A. promissa*. The thin, rather acutely acuminate leaves of Kalbreyer 7 are clearly young, and are possibly shade leaves.

The type of *A. talbotii* var. *longissima* S. Moore consists of young unopened flowers which exactly match those in a similar stage of development in some of Mildbraed's specimens ; it also includes fruits. Typical *A. talbotii* S. Moore appears to be distinct.

The description (in French only) and figures of *A. congolana* Hauman, as well as the specimens I have examined in Bruxelles, leave no doubt that the plant from Yangambi is also *P. promissa*. A remarkable error has occurred in the figures of *A. congolana* in the Flore du Congo Belge et Ruanda-Urundi ; in Pl. 38 B and fig. 3 the flowers are shown upside down ! The 3 long tails hang down from lower side of the perianth tube ; the photograph published here (fig. 1) shows this point very well, and so do Master's original description and specific epithet.

***Pararistolochia tenuicauda* (S. Moore) Keay comb. nov.**

Aristolochia tenuicauda S. Moore in Cat. Talb. Nig. Pl. 94 (1913) ; Hutch. et Dalz. F.W.T.A. **1** : 78 (1927).

PLATE I.



Pararistolochia promissa (Mast.) Keay. British Cameroons, S. Bakundu Forest Reserve,
at Bopo ; March 1948. Photo by Dr. E. W. Jones.

This species, still known only from Talbot's type gathering (*Talbot* 2318 from Oban, S. Nigeria), is closely allied to *P. promissa*. It differs in the smaller perianth tube abruptly narrowed into the three long tails (about 15 cm.). It is of the same habit as *P. promissa* and although the fruits are not known it seems highly probable that it is a *Pararistolochia* and I have made the new combination accordingly.

Pararistolochia talbotii (*S. Moore*) *Keay* comb. nov.

Aristolochia talbotii *S. Moore* l.c. 93 (1913) ; *Hutch. et Dalz. l.c.* 78 (1927), excluding var. *longissima* *S. Moore* l.c.

Like the last, this species is still known only from the type gatherings (*Talbot* 128, 2310 from Oban) but is so clearly allied to *P. promissa* that the new combination appears necessary. It differs from *P. promissa* in the much smaller perianth abruptly narrowed into a single tail (not 3 as in *P. promissa* and *P. tenuicauda*). *Talbot* 1642, the type of *A. talbotii* var. *longissima* consists of flowers which I take to be immature *P. promissa* ; they have 3 tails gradually tapering from the tube. This specimen also includes fruits typical of *Pararistolochia promissa*.

CAPPARIDACEAE

Ritchiea duchesnei (*De Wild.*) *Keay* comb. nov.

Capparis duchesnei *De Wild.* in *Miss. Laurent* **1** : 87 (1905) ; *Hauman et Wilczek* in *Fl. Congo Belge* **2** : 459 (1951).

Capparis afzelii *Pax* in *Engl. Bot. Jahrb.* **14** : 299 (1892), non *DC. Prodr.* **1** : 246 (1824) ; *Gilg et Benedict* in *Engl. Bot. Jahrb.* **53** : 199 (1915) ; *Hutch. et Dalz. F.W.T.A.* **1** : 85 (1927) ; *Chevalier Fl. Viv.* **1** : 170 (1938).

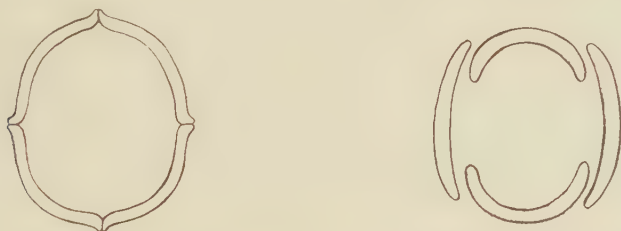


FIG. 2. Arrangement of sepals in bud: Left: *Ritchiea duchesnei* (*De Wild.*) *Keay*, (*Vigne* 1783 from Gold Coast). Right : *Capparis kirkii* *Oliv.* (*Dale* K. 772 from Kenya). Both $\times 10$.

Type :—*Duchesne* 19 from Belgian Congo.

Extends from Sierra Leone to Uganda and the Belgian Congo.

This species is transferred to *Ritchiea* *R. Br.* on account of the sepals which are valvate and acute at the apex in bud. It does in fact agree very well with *Ritchiea*, especially with the simple-leaved species in almost every character except the petals. In all other species of *Ritchiea* the petals are linear or oblanceolate and considerably longer than the sepals, whereas in *R. duchesnei* they are obovate and slightly shorter than the sepals. This character seems, however, of less importance than the valvate sepals.

In the genus *Capparis* Linn., this species has usually (e.g. Pax et Hoffmann in Engl. et Prantl Pflanzenfam. II, **17 b** : 176 (1936), and Hauman et Wilczek in Fl. Congo Belge **2** : 459 (1951) , been placed next to *C. kirkii* Oliv. which is also a thornless tree with simple leaves. In *C. kirkii* however the sepals are imbricate in two series, an arrangement which is commonly found in *Capparis* : see fig. 2. Both Pax and De Wildeman in describing *Capparis duchesnei* De Wild. (= *C. afzelii* Pax non DC.) suggested that it is related to *Capparis reflexa* Schum. et Thonn., a species which Gilg and Benedict (Engl. Bot. Jahrb. **53** : 199) later transferred to *Ritchiea* where it is now generally recognised to be correctly placed.

MELASTOMATACEAE

Memecylon Linn.

G. Don in Gen. Syst. **2** : 655 (1832) described three species of *Memecylon* from Sierra Leone :—*M. cinnamomoides* G. Don, *M. afzelii* G. Don and *M. blackioides* G. Don. These species are listed in the first volume of the Index Kewensis, but strangely enough have been ignored by all monographers of African *Melastomataceae*, including Naudin, Triana, J. D. Hooker, Cogniaux and Gilg. Don's species are in fact the first species of *Memecylon* to be described from tropical Africa, and so must replace names which are in current use. They are :—

M. cinnamomoides G. Don ["cinnamomoides"] Gen. Syst. **2** : 655 (1832).

M. cinnamomoides Gilg in Engl. Monogr. Afr. Pfl. Melastom. 39 (1898) ; Hutch. et Dalz. F.W.T.A. **1** : 215 (1927) *pro parte*.

Don's type specimen was in Herb. Lambert, but he did not specify the collector ; I have been unable to trace in the Kew and British Museum herbaria any specimen which might be authentic. The type of *M. cinnamomoides* Gilg was however a specimen in the Berlin herbarium collected in Sierra Leone by Afzelius and bearing the manuscript name *M. cinnamomoides* in a handwriting unknown to Gilg. Now the description of *M. cinnamomoides* G. Don agrees very well with that of *M. cinnamomoides* Gilg and it seems to me very probable that Gilg was in fact describing an authentic specimen of Don's species.

M. afzelii G. Don l.c. (1832).

M. polyanthemos Hook. f. in Oliv. F.T.A. **2** : 463 (1871) ; Triana in Trans. Linn. Soc. **28** : 156 (1881) ; Cogniaux in DC. Monogr. **7** Melastom. 1161 (1891) ; Gilg l.c. 44 (1898) ; Hutch. et Dalz. l.c. 214 (1927).

Don's type was a specimen from Sierra Leone in Herb. Lambert, and although he does not actually specify a collector it was presumably Afzelius. A specimen in the British Museum herbarium collected by Afzelius in Sierra Leone is named in Robert Brown's writing "*Memecylon afzelii* Br. mst." The specimen agrees perfectly with Don's description and is very probably authentic. *M. afzelii* G. Don is certainly the same as *M. polyanthemos* Hook. f. Triana, Cogniaux and Gilg all quoted Brown's manuscript name *M. afzelii* as a synonym of *M. polyanthemos* Hook. f., ignoring the much earlier valid publication by Don.

M. blakeoides G. Don ["blackioides"] l.c. (1832).

Spathandra caerulea Guill. et Perr. Tent. Fl. Senegamb. 313, t. 71 (1833).

M. caerulea (Guill. et Perr.) Hook. f. in Oliv. F.T.A. 2 : 461 (1871), non *M. caerulea* Jack, Malay. Misc. 1, 5 : 26 (1820).

M. spathandra Bl. Mus. Bot. 1 : 361 (1851) ; Cogniaux in DC. Monogr. 7 Melastom. 1131 (1891) ; Gilg in Engl. Monogr. Afr. Pfl. Melastom. 38 (1898) ; Hutch. et Dalz. F.W.T.A. 1 : 215 (1927).

M. strychnoides Bak. in Kew Bull. 1895 : 105 (1895), non Gilg l.c. 39 (1898) ; Hutch. et Dalz. l.c.

M. millenii Gilg l.c. 38 (1898).

Here again Don does not actually cite a type specimen but only states that the new species came from Sierra Leone. A specimen in the British Museum collected in Sierra Leone by Don himself bears the inscription in Don's writing "Genus nova Blackioides sp". This specimen clearly agrees with Don's description of *M. blakeoides* and with the plant well known in West Africa as *M. spathandra* Bl.

Don described the species as *M. blackioides*—the "*Blackia*-like *Memecylon*"—but this was evidently a slip as he was presumably referring to *Blakea* P. Br. and not to *Blackia* Schrank ex DC., although both genera belong to the *Melastomataceae*. Further on in the same work Don treats *Blackia* Schrank ex DC. as a synonym of *Myriaspora* DC., but described several species of *Blakea* P. Br. Now the Sierra Leone *Memecylon* certainly does not resemble *Myriaspora* DC. (= *Blackia* Schrank ex DC.), but it does resemble species of *Blakea* P. Br. I am therefore following the Index Kewensis in adopting the spelling *M. blakeoides*.

Memecylon guineense Keay nom. nov.

M. sessile A. Chev. ex Hutch. et Dalz. F.W.T.A. 1 : 214, 215 (1927) ; A. Chev. in Expl. Bot. 278 (1920) *nomen nudum* ; A. Chev. in Bull. Mus. Hist. Nat. II 4 : 687 (1932) ; Aubreville Fl. For. Côte d'Ivoire 3 : 76 (1936) ; non *M. sessile* Wall. ex Wight et Arn. Prod. Fl. Pen. Ind. Or. 320 (1834).

Previously known only from the Ivory Coast, now recorded from the Dukwia River, Liberia (Cooper 251), and from two localities in south-western Nigeria (Shasha Forest Reserve, Richards 3475 ; and Okomu Forest Reserve, Brenan 8422, 8735, 9142, 9159).

Memecylon meikleii Keay sp. nov. ; *M. guineensi* Keay (=*M. sessile* A. Chev. ex Hutch. et Dalz.) affine, inflorescentiis longe pedunculatis, floribus plurimis, foliis ovatis basi alte cordatis fere subamplexicaulibus differt.

Frutex extensus, usque 3.5 m. altus, glaber. *Rami* tereti 2–5 mm. diametro, cortice pallide brunneo decorticante obtecti, nodis incrassatis ; *ramuli* juveniles 1–2 mm. diametro pallide virides, quadri-alates, alis in appendiculis triangularis sub nodis productis. *Folia* ovata vel late ovata vel elliptico-ovata, chartacea vel subcoriacea, apice sensim acuminata vel nonnumquam subito acuminata, apice ipso obtusa et mucronata, basi cordate vel fere subamplexicaulia, 5.5–13.5 cm. longa, 3–6 cm. lata, supra in siccitate opaca vel nitidula olivacea, subtus nitidula pallidiora, prominenter trinervia, nervis lateralibus validis ab laminae basi abeunti-

bus et usque ad folii apicem a margine circiter 4-10 mm. percurrentibus, inter nervos transversales haud vel vix conspicue curvatis; nonnumquam quinquenervia, nervis debilibus inter marginem et jugam validum additis; nervi transversales 6-10 juga venulis numerosis laxè reticulati; costa nervique laterales validi supra impressi subtus prominentes, nervis transversalibus venulisque utrinque prominulis; petiolus 1.5-3 mm. longus. *Cymae* 6-16 florum, glomeruliformae, solitariae e nodis ramulorum exorientes, pedunculis quadrialatis 5-12 mm. longis, bracteis duabus 2 mm. longis lanceolatis apice pedunculi insertis; flores sessiles vel subsessiles, bracteolis ovatis 2 mm. longis latisque, apice acutis. *Receptaculum* late obconicum, medio vix constrictum, 2.8 mm. altum apice 3-3.5 mm. diametro. *Calycis segmenti* imbricati, subsemiorbiculares, apice late rotundati, 1.75 mm. lati, 0.75 mm. alti. *Petala* in alabastra imbricata, late oblongo-obovata, paulum obliqua, 3.5 mm. longa, 1.5 mm. lata, apice rotundata, inferne in basim obscure unguiculatum sensim angustata. *Staminum filamenta* circiter 5 mm. longa; antherae dolabariiformae circiter 1 mm. longae. *Stylus* circiter 6 mm. longus. *Ovula* 8, albidia, circiter 0.8 mm. longa. *Fructus* ignotus.

NIGERIA: Oyo Province, Ibadan, Eleyele Hill, above Waterworks, 11 March 1950, *Meikle* 1253 (typus in Herb. Kew.): spreading shrub about 3.5 m. high; at edge of path among dense scrub; twigs scaly, light brown; leaves deep glossy green above, slightly paler below with prominent nerves; calyx dull yellowish-green, petal mauve-pink, style and filaments bright cobalt blue; anthers yellow.

***Osbeckia decandra* (Sm.) DC. Prodr. 3: 143 (1828).**

O. zeylanica Linn. f. var. *decandra* Sm. in Rees Cyclop. 25 (1813).

Dissotis decandra (Sm.) Triana in Trans. Linn. Soc. 28: 58 (1871).

Antherotoma afzelii Hook. f. in Oliv. F.T.A. 2: 444 (1871).

O. afzelii (Hook. f.) Cogn. in DC. Monogr. 7: 330 (1891): Gilg in Engl. Monogr. Afr. Pfl. Melastom. 6, t. lc. (1898): Jacques-Felix in Bull. Mus. Hist. Nat. II 7: 370 (1935).

The identity of *Osbeckia decandra* (Sm.) DC. has remained uncertain for many years. Gilg (l.c. 7) suggested that it might be the same as *O. afzelii* (Hook. f.) Cogn., but as he had not seen authentic material he followed Cogniaux in placing it near *O. senegambiensis* Guill. et Perr. and in keeping it distinct from *O. afzelii*.

There is a specimen in the British Museum collected by Afzelius in Sierra Leone and labelled and initialled by Robert Brown "*Osbeckia zeylanica* var. Sm. in Rees Cyclop., sed sp. distincta".

This specimen is evidently authentic *O. decandra* (Sm.) DC. and is in my opinion undoubtedly the same as *O. afzelii* (Hook. f.) Cogn. as described by Hooker and as described and illustrated by Gilg who studied the type in the Berlin Herbarium; the two names may, in fact, well be based on the same gathering by Afzelius. *O. decandra* (Sm.) DC. is very similar in general appearance to *Antherotoma naudinii* Hook. f. but is distinguished by its 5-merous flowers and anther-connectives without appendages. *Osbeckia decandra* has so far been found only in French Guinea and Sierra Leone, while *Antherotoma naudinii*, which is widespread in tropical Africa,

Natal and Madagascar, reaches its westernmost station in the Bauchi Plateau of Nigeria. I cite here all the specimens known to me of *Osbeckia decandra* (Sm.) DC. :—

FRENCH GUINEA: Kindia *Jacques-Felix* 190 (P.).

SIERRA LEONE: *Afzelius* s.n. (BM.). Freetown, Tower Hill (fl. Oct.) *Deighton* 2514 (K.). Near Mapaki (fl. Aug.) *Deighton* 1296 (K.; BM.). Bumbuna to Farangbaia (fl. Sept.) *Deighton* 5147 (K.). Rokupr (fl. Nov.) *Jordan* 153 (K.). Sasa (fl. Sept.) *Jordan* 321 (K.).

IVORY COAST: Mt. Tonkoni, near Man *Farvager* (Herb. Univ. Neuchatel, Suisse).

The specimens from French Guinea and the Ivory Coast have been identified as *O. afzelii* Hook. f. Cogn. by M. Jacques-Felix, who, together with Prof. Farvager, first drew my attention to the differences between this plant and *Antherotoma naudinii* with which it was previously confused at Kew. I am much indebted to M. Jacques-Felix and to Prof. Farvager for valuable advice and co-operation in the revision of the *Melastomataceae* for the F.W.T.A.

NOTES ON ASIATIC GRASSES: IV.

**What is the correct name of *Capillipedium assimile* (Steud.)
A. Camus ?**

N. L. BOR.

The nomenclatural history of this species is somewhat confused, and as it is one of the commonest grasses in India, it is important that its name should now be finally stabilised.

The confusion really arises from the fact that the same species was given three different names in Steudel's *Synopsis Plantarum Glumaccarum* (1854). When Hackel was writing up the *Andropogoneae* in DC., *Monographiae Phanerogamarum* 6, 491 (1889) he mistakenly considered these three species to be varieties of *Andropogon montanus* of Roxburgh. *Andropogon montanus* Roxb. is a very dubious species, only known from Roxburgh's drawing and is most likely a *Bothriochloa*. Thus when Hackel had finished his monograph the position was exactly as it had been before except that he had added another name to synonymy.

The three species of Steudel are :—

no. 429 *Andropogon glaucopsis* Steud., Syn Pl. Glum. 397 (1854).

no. 430 *A. subrepens* Steud., loc. cit. 397.

no. 433 *A. assimilis* Steud., loc. cit. 397.

There is no doubt whatever about the identity of these plants. *A. glaucopsis* is based upon Wallich's 8786, *A. subrepens* on Wallich's 8790 (both at Kew) and *A. assimilis* on Zollinger's plant no. 859. The latter plant is in the Musée d'Histoire Naturelle in Paris, and Mlle. A. Camus vouches for its being exactly the same as the type of *A. glaucopsis*. An inspection of these sheets leads one to the conclusion that they all repre-

sent the same species, the only difference between them being that *A. glaucopsis* Steud. has hairy nodes.

But if all these represent one species, what is the species to be called? That such a contingency might arise had not been overlooked by the compilers of the International Rules of Nomenclature, and Article 56 reads "when two or more groups of the same rank are united the oldest legitimate name or (in species and their subdivisions) the oldest legitimate epithet is retained. If the names or epithets are of the same date, the author who unites the groups has the right of choosing one of them. The author who first adopts one of them, definitely treating another as a synonym or referring it to a subordinate group must be followed." In other words the first author who unites these species may select any epithet he likes and provided the other names are included in synonymy, he *must* be followed.

Now, the first time these three species were united under one specific epithet was in the *Flora of British India*, 7, 179 (1896, where J. D. Hooker cites *A. glaucopsis* and *A. repens* as synonyms under the name *Andropogon assimilis* Steud. This settles the issue of the specific epithet at once. Mlle. A. Camus transferred this species to *Capillipedium* in Lecomte, Flor. Génér. de l'Indo-Chine, 7, 314 (1922). Stapf also intended to transfer this grass to *Capillipedium* but in Hooker's Icon. Plant. sub tab. 3085 (1922) he selected the epithet *glaucopsis* as he was mistakenly of the opinion that the name *Andropogon assimilis* Steud. referred to another species. Obviously he was not aware of the existence of Zollinger's plant.

Eighteen years later Henrard made the new combination *Capillipedium subrepens* (Steud.) Henr. for these three names in Blumea, 3, 463 (1940). He pointed out that the epithet *glaucopsis** is invalid and preferred the epithet *subrepens* to *assimilis* on the grounds that "Steudel's *A. subrepens* has priority over *A. assimilis*." What Henrard meant by this statement is not at all clear. At any rate the species *A. subrepens* has no priority whatever over *A. assimilis*. If the earlier position of *A. subrepens* on page 397 of Steudel's book is taken to constitute priority over the more lowly placed *A. assimilis*, one can only say that such an assumption is quite unwarranted.

The correct name of the species and its synonymy are as follows :—

Capillipedium assimile (Steud.) A. Camus in Lecomte, Flor. Génér. de l'Indo-Chine, 7, 31 (1922).

Andropogon assimilis Steud., Syn. Pl. Glum. 397 (1854).

A. montanus Hack. in DC., Monogr. Phan. 6, 490 (1889) non Roxb.

Andropogon glaucopsis Steud., loc. cit. 397.

Capillipedium glaucopsis (Steud.) Stapf in Hook., Icon. Pl. sub tab. 3085 (1922).

A. subrepens Steud., loc. cit. 397.

Capillipedium subrepens (Steud.) Henr. in Blumea 3, 463 (1940).

**Andropogon glaucopsis* Steud. (1854) is not an invalid name since the earlier *A. glaucopsis* is only mentioned in Steud., Nom. Bot. ed. 2, 1, 91 (1840) in synonymy and has no status vide Art. 40 of the Rules.

NOTES ON AFRICAN MARANTACEAE*

E. MILNE-REDHEAD

II. *PHRYNIUM* WILLD. EMEND. K. SCHUM. IN AFRICA

In his treatment of the *Marantaceae* in Engler's *Pflanzenreich*, K. Schumann (1902) refers two tropical African species with doubt to *Phrynium*. In the specific key these are separated from the Asiatic species under the letter B as follows :—

- “ A. Plantae basi foliosae quasi acaules inflorescentiam e medio emittentes haud ramosae ; species asiaticae vel neo-guineenses ”
 “ B. Plantae apice ramosae, species africanae a typicis secedentes, an hujus generis? ”

My work on the *Marantaceae* for the Flora of Tropical East Africa has caused me to examine the genus *Phrynium*, for the widely-spread species, *P. confertum* (Benth.) K. Schum., occurs in the area covered by that Flora. The second species given by Schumann, *P. mannii* (Benth.) K. Schum., was known only from the type gathering from Fernando Po, and strangely had never been re-collected. In order to see how its inflorescence compared with that of *P. confertum*, I dissected a part of the type specimen, and to my surprise found it to be a species of *Marantochloa*. Whilst the bracts are a little wider than is normal, I feel confident in stating that *P. mannii* is conspecific with *M. hensii* (Baker) Pellegr., a species which is now known also to occur in Nigeria, Benin (*Brenan* 8470), and the Gold Coast, Kumasi (*Darko* 486), although it was not known from the area covered by the Flora of West Tropical Africa when Hutchinson (1936) published his account of the *Marantaceae*. As Bentham's epithet is the earlier, a new combination is necessary :—

Marantochloa mannii (Benth.) Milne-Redh., comb. nov.

Calathea mannii Benth. in Benth. & Hook. f., Gen. Pl. **3**, 653 (1883);

Baker in Dyer, Fl. Trop. Afr. **7**, 327 (1898)

Phrynium hensii Baker in Dyer, Fl. Trop. Afr. **7**, 323 (1898)

Phrynium mannii (Benth.) K. Schum. in Engl. Pflanzenr. IV. **48**, 56 (1902); Hutch. in Hutch. & Dalz., Fl. W. Trop. Afr. **2**, 337 (1936)

Clinogyne hensii (Baker) K. Schum. in Engl. Pflanzenr. IV. **48**, 62 (1902)

Marantochloa hensii (Baker) Pellegr. in Mém. Soc. Linn. Norm., Nouv. Sér., Bot., **1**, 45 (1938); Léon. & Mull. in Bull. Soc. Roy. Bot. Belg. **83**, 22 (1950)

M. mannii shows variation in the width of the bracts, and in the length of the peduncle of the two-flowered cymule. In a gathering from Uganda, Entebbe (*Eggeling* 5724), the peduncle is less than 1 mm. long and the cymules may be described as subsessile whilst in other collections the peduncle is as much as 6 mm. long.

* Continued from Kew Bull. 1950, 163 (1950).

Having disposed of *Phrynium mannii*, we will now consider the second species, *P. confertum* (Benth.) K. Schum. Gagnepain (1908) described the genus *Ataenidia*, and a single species, *A. gabonensis* Gagnep., based on material collected by Le Testu and by Klaine in Gabon and a cultivated plant in the Gardens of the Museum at Paris. The genus was considered to include the African species which Schumann had so doubtfully placed in *Phrynium*, although the actual combinations were not published. Gagnepain had not seen the type specimens of the two species, *P. mannii* and *P. confertum*, so he knew them only from descriptions, which were far from satisfactory and scarcely mentioned the characters of the inflorescences and of the flowers. It is not surprising, therefore, that he failed to realise that *P. mannii* was wrongly placed in *Ataenidia*. Gagnepain was probably familiar with dried material of the widely-spread *P. confertum* but he was again misled by Schumann describing its flowers as being blue. Bentham (1883) made no mention of the flower colour of his *Calathea conferta*, neither is there any colour note on Mann's specimen on which the specific name is based. Even Welwitsch whose field notes are so excellent and who collected the species in Angola which was described as *Phrynium textile* Ridl., does not describe the colour of the flowers. Recent gatherings at Kew show the flowers to be pale pink, pale lilac or pale pinkish-purple. It seems likely, therefore, that the flowers of *Phrynium confertum* were stated to be blue in error, and that flower colour does not serve to separate specifically *A. gabonensis* which has white flowers from *P. confertum*. The other characters used by Gagnepain are not, in my view, of specific importance, and, after examination of a duplicate of the type specimen, I have no doubt in considering these two plants conspecific.

I agree, however, with Gagnepain in separating *Ataenidia* from the Asiatic and Malasian *Phrynium*, from which it differs in its branched habit with several leaves arising at the base of the inflorescence, in the absence of leaves with long petioles arising direct from the rhizome, in the absence of the spur-like appendage to the hooded staminode, and in the membranous, not tough or woody, texture of the indehiscent fruit. Unfortunately another new combination is required :—

***Ataenidia conferta* (Benth.) Milne-Redh., comb. nov.**

Calathea conferta Benth. in Benth. & Hook. f., Gen. Pl. **3**, 653 (1883);
Baker in Dyer, Fl. Trop. Afr. **7**, 327 (1898)

Phrynium textile Ridl. in Journ. Bot. **25**, 133 (1887)

Phrynium confertum (Benth.) K. Schum. in Engl. Pflanzenr. IV. **48**,
56 (1902); Hutch. in Hutch. & Dalz., Fl. W. Trop. Afr. **2**, 337
(1936); Léon. & Mull. in Bull. Soc. Roy. Bot. Belg. **83**, 24 (1950)

Ataenidia gabonensis Gagnep. in Bull. Soc. Bot. Fr. **55**, XCI (1908)

III. THE GENUS *SARCOPHRYNium* K. SCHUM.

The genus *Sarcophrynium* was made by K. Schumann (1902) to accommodate certain African species of *Phrynium* which have fleshy fruits. Schumann recognized 11 species, of which 10 had previously been in *Phrynium* and one was newly described.

Owing to the excellent gatherings in spirit of African *Marantaceae*

which have been received from numerous correspondents in Africa in recent years, I have been able to examine the structure of the inflorescences of several species of *Sarcophrynium*. As a result, I have found that the species can be divided into two distinct groups differing in so many characters that I have no alternative but to consider them as representing two distinct genera.

The two groups differ as follows :—

A	B
Cymules 1 per node.	Cymules 3–4 per node.
Bract including the part of the inflorescence above it.	Bract not including the part of the inflorescence above it.
Bracts deciduous at anthesis.	Bracts persistent in fruit.
Flowers \pm side by side.	Flowers at different levels.
Fleshy bracteole 1 per cymule.	Fleshy bracteole 2 per cymule.
Outer staminodes lanceolate, linear, subulate or one absent.	Outer staminodes obovate.
Fruit with conspicuous sutures, tardily dehiscent.	Fruit without obvious sutures, indehiscent.
Seeds arillate.	Seeds without an aril.

Examination of Schumann's description shows that few of these characters which I consider diagnostic have been mentioned. He does, however, state that the seed is not arillate and that the fruit is normally indehiscent, both important characters of Group B. On the other hand, five of his species belong to Group B whilst 6 belong to Group A. I am, however, doubtful if many of these six species can be maintained, some at least being separated on slender characters and in one case an imaginary character has been used. In his key Schumann states the peduncle of *S. adenocarpum* (K. Schum.) K. Schum. is 10 mm. long whilst in his description of the species on the opposite page he gives it correctly as 5 mm. *S. adenocarpum* therefore becomes difficult to separate from the species which follow it. On the other hand, most of the species falling into Group B appear to me to be sound. I therefore propose to retain *Sarcophrynium* K. Schum. for the species which fall into Group B. There being no available generic synonyms, the species of Group A require a new generic name.

Megaphrynium Milne-Redh., gen. nov., a *Sarcophrynium* K. Schum., sensu stricto, paribus florum solitariis, bracteis complicatis omnia alabastra superiora includentibus sub anthesi caducis, cymula floribus collateralibus et bracteola carnosa solitaria munita, fructu suturis conspicuis instructo, seminibus arillatis valde distinctum.

Sarcophrynium K. Schum. in Engl. Pflanzenr. IV. **48**, 35 (1902), *pro parte*

Herbae perennes, elatae, glabrae vel pubescentes. *Caules* simplices, inflorescentia et folio solitario subtendente terminati. *Folia* basalia longissime petiolata, lamina ampla elliptica vix asymmetrica instructa ; folium apicale simile sed petiolo brevior munitum. *Inflorescentia* pauciramosa vel interdum simplex ; rami spiciformes, ariculati, nodis numerosis (circiter 20) instructi ; cymulae ad nodos solitariae, quaeque

cum omnibus alabastris superioribus in bractea sub anthesi caduca inclusa ; cymulae floribus geminatis collateralibus instructae et bracteola carnosae solitariae munitae. *Sepala* libera. *Petala* inferne in tubo connata. *Staminodia* exteriora bina, anguste lanceolata, linearia vel subulata, interdum abortu solitaria ; staminodium cucullatum appendicula calcariformi munitum. *Ovarium* triloculare, loculis omnibus ovula includentibus. *Capsula* depresso-globosa, suturis conspicuis instructa, tarde dehiscens, extra glabra, rubra, intus carnosae vel mucilaginosae, albida. *Semina* arillata.

Typus generis : **Megaphrynium macrostachyum** 'Benth. Milne-Redh., comb. nov.

Phrynium macrostachyum Benth. in Benth. & Hook. f., Gen. Pl. **3**, 653 (1883)

Phyllodes macrostachyum (Benth.) K. Schum. in Engl., Bot. Jahrb. **15**, 445 (1892)

Phyllodes macrophyllum K. Schum. in Engl., Bot. Jahrb. **15**, 444 1892

Phrynium benthami Bak. in Dyer, Fl. Trop. Afr. **7**, 323 (1898, *nom. illegit.*)

Phrynium macrophyllum (K. Schum.) Bak. in Dyer, Fl. Trop. Afr. **7**, 323 (1898); Hutch. in Hutch. & Dalz., Fl. W. Trop. Afr. **2**, 336 (1936)

Sarcophrynium macrostachyum (Benth.) K. Schum. in Engl., Pflanzenr. IV. **48**, 37 (1902) ; Léon. & Mull. in Bull. Soc. Roy. Bot. Belg. **83**, 28 (1950)

Sarcophrynium arnoldianum De Wild. in Ann. Mus. Cong. Bot., Sér. V. **1**, 107 (1904)

The following species also belong to *Megaphrynium*, but I would like to study them further before either reducing them to the above synonymy, or alternatively making any combination with *Megaphrynium* that may be necessary.

Sarcophrynium adenocarpum (K. Schum.) K. Schum.

S. bisubulatum (K. Schum.) K. Schum.

S. oxycarpum (K. Schum.) K. Schum.

S. velutinum (Bak.) K. Schum.

S. spicatum K. Schum.

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Schumann, K. (1902) "*Sarcophrynium* K. Schum." in Engler, Das Pflanzenreich IV, **48** (Marantaceae), 35-40.

STUDIES IN THE ERICALES: X.*

An undescribed Asiatic *Gaultheria*, with a key to the Sino-Himalayan species of Section *Leucothoides*.

H. K. AIRY SHAW.

Gaultheria* (§*Leucothoides*) *stapfiana *Airy Shaw*, sp. nov., *G. hookeri* C. B. Clarke (*G. leitchianae* Craib) arcte affinis, habitu plerumque elatiore et robustiore, setis ramulorum plerumque brevioribus et sparsioribus plus minus adpressis nec late patentibus distinguenda. — ? *G. fragrantissima* var. *racemosa* Hook. fil. ex C. B. Clarke in Hook. fil. *Fl. Brit. Ind.* **3**, 458 (1882).

Frutex dumosus, (0.15–) 0.6–2.7 m. altus; ramuli rigidi, 2–4 mm. crassi, teretes vel juniores \pm angulati, siccitate castanei vel rubro-brunnei, apicem versus setulis brevibus sparsis adpressis vel patulis castaneis vel fuscis praediti vel glabri. *Folia* oblanceolata vel obovata vel oblongo-elliptica, 4–14 cm. longa, 1–4.5 cm. lata, basi cuneata usque rotundata, apice acuta usque rotundata et apiculata vel brevissime deflexo-subcaudata, margine brevissime serrata, coriacea, supra saturate viridia, nitida, glaberrima, subtus pallide viridia, haud nitida, punctis elevatis rubidis basibus setularum mane delapsarum) densiuscule obsita; costa valida, subtus elevata, supra alte impressa; nervi primarii laterales 3–6-jugi, procurvi, subtus prominuli, supra conspicue insculpti, secundariis multis reticulatim interpositis; petiolus brevis, 2–12 mm. longus, parce setulosus vel glaber. *Racemi* (1–2–5–12) cm. longi, usque 20-flori, rhachi puberula vel glabra leviter anfractuosa; bractae conspicuae, late ovatae, valde convexae, cucullato-cymbiformes, membranaceae, 3–5 mm. longae, acutae, dorso glabrae vel puberulae, margine minute ciliolatae; pedicelli 5–9 mm. longi, glabri vel minute puberuli, apice articulati; bracteolae 1–3 mm. infra apicem pedicelli sitae, ovatae, 1–2 mm. longae, acutae, glabrae vel minutissime puberulae, minute ciliolatae. *Calyx* late aperte cupularis, 4–5 mm. diametro, segmentis ovato-deltoides 1–2 mm. longis acutis glabris ciliolatis. *Corolla* urceolata, ovoidea usque subglobosa, 3–4 mm. longa, intus saepe puberula, albida vel viridula vel rosea vel obscure roseo-purpurea. *Filamenta* ovato-lanceolata, 1–2 mm. longa, applanata, superne attenuata, glabra; antherae ovato-oblongae, 1 mm. longae, thecis biaristatis, aristis gracilibus angulo recto patentibus. *Ovarium* globosum, 1 mm. diametro, pubescens, stylo 3–4 mm. longo glabro. *Fructus* subglobosus vel oblongo-ovoideus, 6–8 mm. diametro, azureus vel purpurascens.

YUNNAN. Open situations on the margins of pine forests on the ascent of the Sung Kwei pass, lat. 26° 30' N., alt. 2700 m., Sept. 1904, *Forrest* 5066: "Shrub of 2–6 ft. Flowers ruddy green." On the margins of pine forests on the Kari pass, Yangtze-Mekong divide, lat. 28° N., alt. 2400–3000 m., Sept. 1904, *Forrest* 5067: "Shrub of 3–5 ft. Flowers dull green, fragrant." Amongst scrub, western flank of the Shweli-Salwin divide, lat. 25° 20' N., alt. 3000 m., Aug. 1912, *Forrest* 9003: "Shrub of 4–9 ft. In fruit, fruits bright blue." Dry open situations amongst rocks, Shweli-Salwin divide, lat. 25° 30' N., alt. 2700–3000 m., Aug. 1913, *Forrest* 11778: "Shrub of 4 ft. Flowers

*Continued from *K.B.* 1948, 495 (1949).

dull greenish white." On open rocky moorland, Mekong-Salwin divide, lat. $28^{\circ} 10' N.$, alt. 3900 m., Sept. 1917, *Forrest* 14966 : "Shrub of 2 ft. In fruit, fruits bright blue." Open scrub and on cliffs, Mekong-Salwin divide, lat. $28^{\circ} 12' N.$, alt. 3600 m., Oct. 1917, *Forrest* 14997 : "Shrub of 2-3 ft. In fruit, fruits bright blue." 'Duplicate of 1912-1913' (? Shweli-Salwin divide), June and July 1917, *Forrest* 15742 and 15809. Rocky situations in ravines and by streams, western flank of the Shweli-Salwin divide, lat. $25^{\circ} 40' N.$, alt. 2700 m., June 1919, *Forrest* 18021 (typus, Herb. Edin.) : "Shrub of 3-4 ft. Flowers dull rose-purple." Rocky situations in side valleys, Jang-tzow Shan, Shweli-Salwin divide, lat. $25^{\circ} 10' N.$, alt. 2700 m., July 1919, *Forrest* 18360 : "Shrub of 3-4 ft. Foliage aromatic ; fruits purple." In regionis temperatae ad fluvium Lu-djiang (Salween) prope Tschamutong pteridietis graminosis supra vicum Bahan, solo schistaceo, alt. 3200-3700 m., 18 June 1916, *Handel-Mazzetti* 8953. N.W. Yunnan, sine loc. exact., 1907, *Monbeig* 162 and 163. Tsekou, June, *Monbeig* 66/1912.

UPPER BURMA. On open hillsides exposed to sun and wind, Htaungaw, valley of Naung-chaung, Lashi country, alt. 2700-3000 m., 1914, *Kingdon Ward* 1617 : "Bushy undershrub of 1-3 ft. Fls. white, tipped with pink." *Ibid.*, half-shade, gullies etc., alt. 2100 m., 3 June 1914, *Kingdon Ward* 1627 : "Undershrub of bushy habit growing to height of 2-3 ft. Fls. white." Forming a general cover over the open slopes on Hpimaw Hill in the lower alpine zone, alt. 2700-3000 m., 30 May 1919, *Farrer* 990 : "1-2 ft., flowers pinkish. Fruit most beautiful, in dense clusters, from pink to bloomy turquoise blue." Occasional in light alpine bamboo-brake, Chawchi pass, alt. 3540 m., 3 July 1920, *Farrer* 1679 : "Probably =F.990, but here a thinner, smaller, poorer, rarer shrub of 6-10 ins.—July 24 : the smaller high-alpine plant appears a different sp." On rocky slopes amongst scrub in side valleys, N'Maikha-Salwin divide, lat. $26^{\circ} 30' N.$, alt. 2700-3000 m., June 1931, *Forrest* 29704 : "Shrub of 2-3 ft. Flowers greenish-white." Over 1 mile above Hpimaw Fort, alt. 2700 m., 26 April 1938, *Kermode* 17240 : "Shrub 4-5 feet high. Flowers pink."

ASSAM. Delei valley, on exposed southern face and along ridge, $28^{\circ} 21' N.$, $96^{\circ} 37' E.$, alt. 2700 m., 19 May 1928, *Kingdon Ward* 8217 : "A small, almost carpet-forming, social undershrub. Flowers white, flushed pink."

SIKKIM. Darjeeling, c. 1849, *Hooker* (type of *G. fragrantissima* var. *racemosa* Hook. fil. ex C. B. Clarke ; probably referable to *G. Stapfiana*). Lachoong, alt. 2550 m., May 1885, *King's Collector* s.n.

A description of this *Gaultheria* has been long overdue. As will be seen above, it is nearly 50 years since *Forrest* obtained the first known specimen, since when it has been repeatedly collected, by himself, by *Farrer*, by *Kingdon Ward*, and by others. It is now in cultivation in some gardens in this country.

I have named it in honour of the late Dr. Otto Stapf, who was the first to distinguish the species (in the Kew Herbarium) and to whose unpublished work on the genus I am so greatly indebted (vide *K.B.*, 1940, 330).

It is undoubtedly very close to *G. hookeri* C. B. Clarke (*G. veitchiana*

Craib), but the long, usually copious, widely spreading bristles on the stems of the latter give it a very distinctive appearance. *G. hookeri* is also usually quite dwarf, though Wilson noted it up to 1.8 m. in height ; *G. stapfiana* is generally a more robust plant.

There has been a tendency to confuse this species with *G. fragrantissima* Wall., but that species (from which *G. forrestii* Diels is perhaps doubtfully distinct) is readily distinguished by the small bracts, which are scarcely larger than the bracteoles, and by the bracteoles being placed very close to the calyx, as well as by a number of smaller points. The following key may facilitate the determination of the Sino-Himalayan species of this section of *Gaultheria* (cf. Airy Shaw in *Kew Bull.* **1940**, 308, 316 : 1941).

KEY TO SINO-HIMALAYAN SPECIES OF GAULTHERIA SECT. LEUCOTHOIDES
(excluding 'Sympodiales').

Racemes very short, subfasciculiform, the main axis often scarcely longer than the pedicels ; innovations and underside of leaves densely and softly long-ferrugineous-pubescent ; leaves narrowly oblong-lanceolate ; plant smelling exceptionally strongly of oil of wintergreen (E. Himalayas) **G. wardii** Marquand et Airy Shaw

Racemes not as above, pedicels much shorter than main axis ; innovations and underside of leaves glabrous or punctate or harshly strigose ; plants less aromatic :

Leaves distinctly and slenderly caudate-acuminate, generally very closely serrate ; corolla usually open-campanulate, glabrous within ; bracteoles at or below middle of often elongate pedicels (Nepal to Yunnan) . . . **G. griffithiana** Wight (*caudata* Stapf)

Leaves acute or obtuse or cuspidate, but not or scarcely caudate, usually more distantly serrate ; corolla ovoid-urceolate :

Branchlets (at least towards apex, or when young) more or less setose :

Setae of branchlets conspicuous, widely spreading ; bracts large (Szechuan, ?Yunnan, ?Upper Burma, Sikkim)
G. hookeri C. B. Clarke (*veitchiana* Craib)

Setae of branchlets less conspicuous, adpressed or at most patulous :

Bracts small, scarcely larger than bracteoles ; sepals narrowly triangular, often appearing subulate-acuminate through strong inrolling of margins ; racemes typically shorter than in any species except *Wardii* ; stems slenderish, leaves smallish (dwarf shrub up to 60 cm. high) (Sikkim, Bhutan, Upper Burma, Yunnan)

G. semi-infera (C. B. Clarke) Airy Shaw
(*tetramera* W. W. Sm.)

Bracts large, conspicuous, sometimes more or less glandular-ciliate as well as minutely ciliate :

Bracts and bracteoles persistent in fruit ; bracteoles much smaller than bracts ; leaves drying reddish-green below, not conspicuously pale ; nerves arising pinnately all up midrib, which is strong and straight (generally a robust plant with large leaves ; very close to *hookeri*) (Yunnan, E. Himalayas, Burma) . . . **G. stapfiana** Airy Shaw

Bracts and bracteoles generally deciduous in fruit, but sometimes persistent; bracteoles almost as large as bracts; leaves drying light cinnamon-brown or even silvery below; nerves few, very arched, arising from near base or at least below middle of leaf; midrib slender and sometimes slightly flexuous (usually a smaller plant with slenderer stems and smaller leaves) (Bhutan, Upper Burma, S.E. Yunnan) . . . **G. discolor** Nutt.

Branchlets glabrous or almost so:

Branchlets strongly and acutely angled, sometimes almost winged, quite glabrous (E. Himalayas, Khasia Hills)

G. fragrantissima Wall.

Branchlets not or scarcely (and bluntly) angled, never winged, sometimes with a few adpressed setae towards apex:

Sepals broadly ovate-deltoid, often more or less imbricate at base, margins broadly submembranous; bracts small, minutely ciliate but not glandular-denticulate; leaves drying very pale cinnamon brown beneath and densely punctate; inflorescence drying very pale; bracteoles close to calyx (very close to *fragrantissima*) (Yunnan, ?E. Himalayas) **G. forrestii** Diels

Sepals deltoid-acute, less ovate, not imbricate at base, margin not broadly submembranous; bracts large, conspicuous, often glandular-denticulate as well as minutely ciliate; leaves drying a darker more livid greenish-brown below, rather less densely punctate; inflorescence not drying pale, calyx-tube especially often drying almost black; bracteoles remote from calyx, often near middle of pedicel (Yunnan, E. Himalayas, Burma) . . . **G. stapfiana** Airy Shaw

Crepis dobrogica Babç., in Bulgaria

ERNEST B. BABCOCK (University of California).

In his first supplementary note on *Crepis*, Babcock (Mem. hors-série Soc. d'Hist. Nat. l'Afr. Nord II: 9. 1949) described this new species which, at that time, was known only from the type, collected in Dobrogea, Rumania, in 1874. Through the kind help of Professor B. Stefanoff of the Bulgarian Academy of Sciences, a revision has been made of specimens in Bulgarian herbaria that had been determined as *Crepis tectorum* L. Three such specimens were found, one collected near Philippopol and two from stations in northeastern Bulgaria bordering on Dobrudga. Professor Stefanoff sent me fragments from the specimen collected near Philippopol; there is no doubt whatever that it is *C. dobrogica*.

The danger involved in basing identification on superficial appearance is well shown by the fact that, in 1948, Professor Nyarady of Cluj, Rumania, expressed the opinion (in. litt.) that *C. dobrogica* is merely a form of *C. setosa* Hal. f.

It is anticipated that the writer will receive seeds of *C. dobrogica* soon, and that its chromosomes can be compared with those of the species believed to be most closely related, namely, *C. neglecta* L., *C. corymbosa* Ten., *C. apula* (Fiori) Babç., and other members of Section 24.

TWO ALLIES OF EPACRIS HETERONEMA LAB.

R. MELVILLE.

Several Tasmanian species have been confused under *Epacris heteronema* Labillardière. This may be due partly to the small size of the flowers and foliage, but partly to the existence of inter-grading between some at least of the species. The intergrading may be due to hybridisation, but more detailed investigation of populations in the field and genetical studies seem to be necessary for the elucidation of some of the problems in this genus. The two entities described below appear to be distinct by the possession of characters not associated together elsewhere in the group. I am indebted to Miss W. H. Curtis of the University of Tasmania, Hobart, for much of the material on which this account is based.

One of the difficulties in the study of *Epacris* is the variability in leaf shape from plant to plant. In one species the leaves may be broader or narrower, longer or shorter, more or less acute at the apex or more or less cordate at the base. There is always a gradation of leaf shape from those first formed on the renewal of growth of a shoot up to the apical leaves. It is advantageous, here, to apply the conception of a "leaf spectrum" found useful in the study of *Ulmus*.^{*} In *Epacris* the characteristic appearance of the foliage is produced by those leaves that are both most numerous and most similar to one another in shape. They occupy the middle range of the seasonal growth of the shoot. On different plants, these leaves of the middle range may belong to different parts of the leaf spectrum of the species, presumably depending on physiological conditions. The relationship of the plants can be determined by examining the leaf spectrum. Similarly a "bract spectrum" is produced by the bracts of the flower peduncles, which may prove to be of value in the definition of species.

***Epacris marginata* Melville, sp. nov., *E. heteronemati* Labillardière affinis sed foliis glaucis albomarginatis, bracteis obtusioribus et stylis brevioribus differt.**

Frutex ramosus rigidus ramulis indumento villosio tectis. Folia ovata vel lanceolata acuminata dense imbricata glauca, apice spinosa, basi auriculata, marginibus albidis hyalinis cincta petiolis villosis. Flores axillares foliis subaequales, bracteis 20–25 scariosis, glabris, obtusis vel acutis. Sepala 5, circiter 3.5 mm. longa, 1.5 mm. lata, ovato-lanceolata acuta scariosa glabra, marginibus minute ciliolatis. Corollae segmenta late ovate acuta, 3–5 mm. longa, 2.5–3 mm. lata, tubo subduplo longiora. Stamina 5, antheris exsertis rubidis, minute papillois 2/5 longitudinis segmentorum corollarum attingentibus. Ovarium subglobosum, circiter 1 mm. diametro, squamis hypogynis triangulatis 1/3–2/3 longitudinis ovarii attingentibus. Stylus ovario subaequilongus vel sesquielongior, 2/3rd longitudinis tubi corollae attingens.

TASMANIA: slopes of Brown Mountain, Tasman Peninsula, J. Somerville, 28.4.1946 (Typus in Herb. Kew.; isotypus in Herb. Univ. Tasman.) Cash's Lookout, Eaglehawk Neck, W. H. Clemes, 13.11.1949; Dr. A. Morrison without date or precise locality.

^{*}Melville, R., Proc. Linn. Soc. Lond., 162 1949–50, 157 (1951).

Dissections of the flower are illustrated in Fig. 1 by camera lucida drawings and the leaf spectrum, drawn from the type specimen, in Fig. 3A. In the type and in the Morrison specimen the majority of leaves are nearest in shape to the outline fourth from the right, but those of the Eaglehawk Neck plant are nearest to the second from the right. Here, in addition to their being narrower, the leaves are longer as well, a class of correlation also found in *Ulmus* and possibly of general occurrence. A note on one of the specimens states that the flowers are reputed to be "honey scented".



FIG. 1. *Epacris marginata* Melville. A. Bracts and calyx. B. Calyx lobe. C. Ovary with hypogynous scales. D. Leaf, upper surface. E. Median transverse section of leaf. F. Corolla opened to show stamens.

***Epacris barbata* Melville**, sp. nov., *E. heteronemati* Labillardière affinis sed foliorum marginibus crasse rotundatis puberulis et sepalis villosobarbatis differt.

Frutex erectus virgatus, usque ad 1 m. altus, ramulis villosis. Folia elliptica vel ovata acuta, vel lanceolata acuminata (3·5–) 5–8 (–15) mm.

longa, (2-) 2.5-3.5 (-4.5) mm. lata, apice spinosa, basi attenuata, brevi petiolata, marginibus crassis, rotundatis, strigillosis vel primum ciliatis, supra plana vel concava plus minus puberula. Flores axillares ad apices ramorum congesta vel in fasciculos terminales globosos disposita. Bracteae circiter 25, imbricatae, ovatae acutae in sepalos transeuntes. Sepala 5, ovato-lanceolata acuta, circiter 5 mm. longa, 2 mm. lata, dorso villosa-barbata plus minus rubro-tincta, marginibus villosa-ciliatis. Corollae segmenta late ovata vel suborbicularia, circiter 5 mm. longa, auriculata; tubus circiter 4.5 mm. longus. Stamina 5, antheris semi-

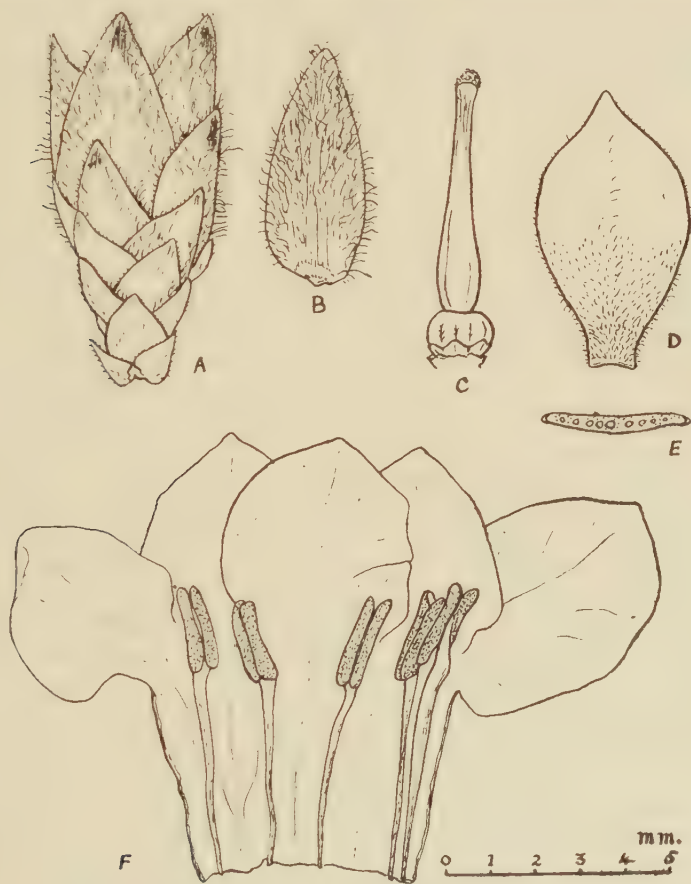


FIG. 2. *Epacris barbata* Melville. A. Bracts and calyx. B. Calyx lobe, outer surface. C. Ovary with hypogynous scales. D. Leaf, upper surface. E. Median transverse section of leaf. F. Corolla opened to show stamens.

exsertis, circiter 2 mm. longis, 0.5-0.7 mm. latis, rubidis, minute papillosis. Stylus circiter 5 mm. longus, antheris subaequilongus, basi tumidus. Ovarium subglobosum depressum, circiter 1.5 mm. diametro, basi squamis 5 hypogynis triangulatis circiter 1/3rd longitudinis ovarii cinctum.

TASMANIA: Coles Bay, East Coast, *W. H. Curtis*, 627.B1. Oct. 1946 (Typus in Herb. Kew.; isotypus in Herb. Univ. Tasman.); 627.B2, Sept. 1948; 627.B3, Oct. 1944; *H. F. Comber*, 2314, 20.4.1930.

The very villous sepals and the leaves with rounded margins more or less puberulous or scabridulous distinguish this species. Other plants occur in Tasmania with slightly villous sepals and differing in the leaf shape and indumentum. There is not at present sufficient evidence to decide whether these are hybrids of *E. barbata* or represent another species.

Dissections of the flower are illustrated in Fig. 2 and the leaf spectrum is shown in Fig. 3B. In the type specimen, the shapes of the leaves of the middle parts of the shoots range from that of the third to that of the fourth from the right in the figure. One spray in the gathering of September 1948 (627.B.2) has mainly narrow leaves similar to the second from the right. There is some variation in the indumentum of the

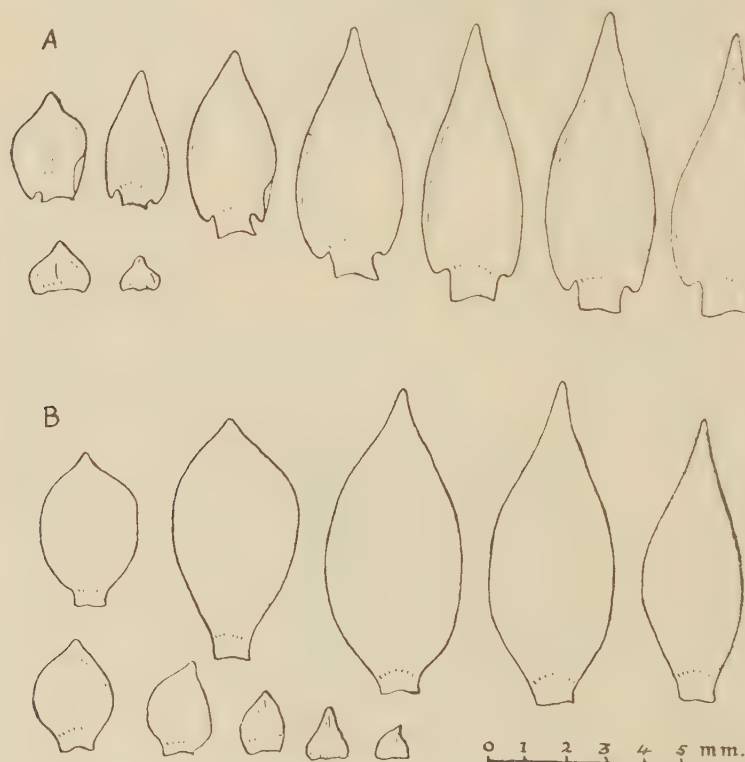


FIG. 3. Leaf spectra or sequence of leaf shapes in A. *Epacris marginata* and B. *E. barbata*. The uppermost leaves are at the right and the sequence follows down the stem towards the left with the bud scales below, left.

leaves, which are sometimes pubescent on the lower third or half of the upper surface and at others the pubescence extends to the tip. Although usually glabrous on the lower surface, there are sometimes a few rather long hairs on the midrib. A tendency towards doubling of the petals was noticed, one spray of the type gathering bearing occasional flowers in which one or more of the stamens had become petaloid. Occasionally the connective is prolonged as a point beyond the anthers, apparently the first stage in the development of petalody.

NOTES ON AFRICAN COMMELINACEAE.

J. P. M. BRENNAN.

The following notes are for the most part products of work on the genera *Aneilema* and *Murdannia*, including a revision of the African species of *Murdannia*. Unless otherwise stated, specimens cited are to be found in the Kew Herbarium.

I must thank the authorities of the Jardin Botanique de l'État at Brussels, the Universitets Botaniske Museum at Copenhagen, the Conservatoire et Jardin Botanique at Geneva, British Museum (Natural History), and the East African Herbarium at Nairobi, who have kindly sent material on loan to me, or allowed me to examine specimens in their charge.

I am also most grateful to Mr. E. Milne-Redhead for all his help and encouragement.

MURDANNIA Royle.

Murdannia was described and published by Royle in *Illustr. Bot. Himal.* 403, t. 95, fig. 3 (1839). The genus was named after Murdan Aly, and its gender is feminine as both Royle and common sense make it, and not the inexplicable neuter adopted by Brückner in the second edition of the *Natürlichen Pflanzenfamilien*.

Pichon in *Not. Syst.* 12, 236 (1946) points out that there are two names earlier than *Murdannia* available—*Dilasia* Raf., *Fl. Tellur.* 4, 122 (1836) with *D. vaginata* (L.) Raf., *l.c.*, 123 = *Murdannia vaginata* (L.) Brückn., and *Streptylis* Raf., *Fl. Tellur.* 4, 122 (1836) (with *S. bracteolata* Raf., *l.c.* = *Murdannia spirata* (L.) Brückn.). Of these two Pichon adopts *Dilasia*. This synonymy is correct, and Merrill, *Index Rafinesquianus*, 83, 84 (1949) accepts Pichon's views. But under *Dilasia* there is only one binomial already made—Rafinesque's original one—and some 25–30 new names will be necessary; while under *Murdannia* all but a very few of the combinations have been made by Brückner or Handel-Mazzetti. In order to avoid this plethora of new names, the reasonable course is to conserve *Murdannia*, and I therefore propose that *Murdannia* Royle (1839) be conserved against *Dilasia* Raf. (1836) and *Streptylis* Raf. (1836).

It will be by now evident that I entirely agree with the separation of *Murdannia* or its equivalent from *Aneilema* R. Br., under which most botanists have hitherto included it.

Woodson in *Ann. Miss. Bot. Gard.* 29, 145 (1942) described *Aneilema* as having the flowers regular "or essentially so" and 3-celled ovaries and capsules, disagreeing with Brückner in considering *Murdannia* and *Aneilema* congeneric. Woodson however seems to have thought that the two genera could, at best, be separated only by the regularity or otherwise of the corolla, which I consider comparatively unimportant, and to have completely missed the fundamental differences in the androecium. I am grateful to Mr. W. T. Stearn for referring me to this paper.

Robert Brown included in his original concept of *Aneilema* both *Aneilema* and *Murdannia*, and there is nothing in the generic description even partly to exclude either. Brückner, in *Engl., Bot. Jahrb.* 61, Beibl. 137, 63 (1927) chose as the lectotype of *Aneilema* *A. biflorum* R. Br., which is certainly an *Aneilema* as he interpreted it. Although the reason for his

choice was the invalid one of priority of position, I have no sufficient taxonomic reason for changing the lectotype, and therefore follow him in this.

Brückner in Engl. et Prantl, Nat. Pflanzenf. ed. 2, **15a**, 173 (1930) and Pichon in Not. Syst. **12**, 236 (1946) sink *Baoulia* A. Chev. under *Murdannia*. I had at first believed that *Baoulia* could be distinguished from *Murdannia* by the absence of staminodes. However a plant of *M. semiteres* cultivated at Kew, originally from Uganda, showed on the same plant flowers with all degrees of development of the staminodes, 0, 1, 2 or 3 per flower. The androecial structures of *Murdannia* and *Baoulia* can thus be present on one plant, and I cannot therefore maintain *Baoulia*.

Some combinations have been recently made under *Phaenilema* Brückn., a genus published in Engl., Bot. Jahrb. **61**, Beibl. 137, 63 (1927), but this was, as Brückner himself later realised, antedated by *Murdannia*.

The following are the most significant characters separating *Aneilema* from *Murdannia* :—

Aneilema. The three anticus stamens normally fertile (including one (rarely sterile) antepetalous one), the three posticus stamens transformed into staminodes (including one antesepalous one). Staminodes bifid or with 2 corpuscles at apex. Capsule 2-valved, sometimes with a smaller third dorsal cell, rarely and inconstantly 3-valved. Anticus petal (? always) smaller than the others.

Murdannia. Three fertile antesepalous stamens alternating with three (rarely 2, 1 or 0) antesepalous staminodes, sometimes one of the antesepalous stamens transformed into a staminode or absent : thus one of the anticus stamens is fertile and two (or one) of the posticus ones. Staminodes hastate or trilobed at apex, resembling a pawnbroker's sign. Capsule subequally 3-valved. Petals subequal.

In general the three-valved capsule of *Murdannia* will separate the African species from all but a very few *Aneilemae*, notably *A. tacazeae* Hochst. ex C. B. Cl. and *A. petersii* (Hassk.) C.B. Cl. The important difference in the structure of the staminodes separating *Murdannia* and *Aneilema* does not seem to have been previously used or noticed, doubtless owing to the great difficulty in examining dried flowers of *Commelinaceae*. The staminodes of *Murdannia* are essentially trilobed at apex, with the lateral lobes sometimes so near the filament as to make the apex hastate. The staminodes of *Aneilema* are essentially bilobed at apex, the lobes sometimes separate or sometimes so near at the base as to make the apex bifid or like a horsehoe (*A. johnstonii* K. Schum.).

I have observed trilobed or hastate staminodes in all the African species of *Murdannia*, except of course in *M. tenuissima* where they are absent, also in *M. dimorpha* (Dalz.) Brückn., *M. divergens* (C. B. Cl.) Brückn., *M. scapiflora* (Roxb.) Royle, and *M. spirata* (L.) Brückn. from Asia, and in *M. gardneri* (Seub.) Brückn. and *M. schomburgkiana* (Kunth) Brückn. from S. America.

Bilobed staminodes I have seen in the following African species of *Aneilema* :—*A. aequinoctiale* (P. Beauv.) Kunth, *A. benadirensis* Chiov., *A. beniniense* (P. Beauv.) Kunth, *A. dispersum* Brenan, *A. dregeanum* Kunth,

A. hirticeps C. B. Cl., *A. hockii* De Wild., *A. johnstonii* K. Schum., *A. lanceolatum* Benth., *A. pedunculatum* C. B. Cl., *A. petersii* (Hassk.) C. B. Cl., *A. plagiocapsa* K. Schum., *A. rendlei* C. B. Cl., *A. silvaticum* Brenan, *A. spekei* C. B. Cl., *A. tacazeanum* Hochst. ex C. B. Cl., *A. unbrosium* (Vahl) Kunth, *A. vankerckhovenii* De Wild., *A. welwitschii* C. B. Cl., also in *A. scaberrimum* Kunth and *A. thomsoni* C. B. Cl. from Asia, and in *A. acuminatum* R. Br., *A. biflorum* R. Br. and *A. siliculosum* R. Br. from Australia.

So far I have found no exceptions.

A key to the African species of *Murdannia* follows ; all belong to the Series *Terminatae* Brückn. in Engl. et Prantl, Nat. Pflanzenf., ed. 2, 15a, 173 1930 , except for *M. tenuissima* which belongs to the Series *Pauciflorae* Brückn., *l.c.*

KEY TO THE AFRICAN SPECIES OF MURDANNIA.

Inflorescence unbranched, consisting of solitary or sometimes paired flowers arising from the axils of 1-3 of the uppermost leaves (bracts); slender, grass-like, simple- or subsimple-stemmed plant, glabrous except for margins of sheaths and lower part of leaves ; leaves linear-lanceolate, 2-5 (-6) mm. wide ; fertile stamens 3 with hairy filaments ; staminodes 0 . . . 7. *M. tenuissima* (A. Chev.) Brenan

Inflorescence normally with distinct lateral branches, cymose, paniculate or verticillate ; rarely (in *M. nudiflora*) occasional inflorescences may be without lateral branches but are then subumbellately racemose ; staminodes normally 1-3, completely absent in occasional flowers of *M. semiteres* :

Inflorescence with an elongate central axis and about 4-7 whorls of short lateral branches up to 1.5 cm. long spreading all round the axis and arising from verticillate bracts on the axis ; leaves 2.5-3 cm. wide ; filaments of 2 fertile stamens glabrous, the third quite absent, not represented by a staminode ; lower leaf-sheaths softly long-hirsute 6. *M. allardi* (De Wild.) Brenan

Inflorescence a cyme or panicle with lateral branches arising singly, sometimes up to three together but then all pointing to one side and arising all from the axil of a single bract on the inflorescence-axis ; leaves 0.1-1.5 cm. wide ; third fertile stamen present or represented by a hairy staminode :

Fertile stamens 3, all developed, with glabrous filaments ; lower leaves linear-filiform, about 0.5-2 mm. wide :

Flowers very small ; pedicels 2.5-5 mm. long ; sepals 1.5-1.8 × 0.8-1.2 mm. ; petals about 2 × 1.1 mm. ; filaments of stamens and staminodes 0.5-1.5 mm. long ; style 1 mm. long ; caespitose herb . . . 2. *M. semiteres* (Dalz.) Brenan

Flowers two to three times as large ; pedicels 4-13 mm. long ; sepals 4 × 1.8-2 mm. ; petals about 6 × 3 mm. ; filaments of stamens and staminodes 2.5-3 mm. long ; style 3 mm. long ; sometimes rhizomatous herb

1. *M. clarkeana* Brenan

Fertile stamens 2, with hairy filaments, the third represented by a hairy staminode ; lower leaves linear-lanceolate to oblong, about 3.5-15 mm. wide, rarely (in *M. stictosperma*) only 1-3.5 mm. wide :

Weak, prostrate or decumbent herb ; leaves relatively short, the lower to 5 (-7) cm. long ; partial inflorescences small, up to 1 (-1.3) cm. long, often appearing subumbellate, their axes slender, without conspicuous scarring ; petals about $3\text{--}3.5 \times 2.5$ mm. 5. *M. nudiflora* (L.) Brenan

Erect, relatively robust herbs ; leaves long, the lower mostly about 7-40 cm. long ; partial inflorescences usually larger, to 2 cm. long, usually more numerous and closer, their axes stouter with usually close-set conspicuous scars left by fallen pedicels ; petals about $5\text{--}7 \times 3.8\text{--}7$ mm. :

Leaves, particularly the radical ones, relatively broad, 3-12 mm. wide ; seeds 1.6-2 mm. long, the testa under a strong lens showing numerous minute whitish pustules but otherwise smooth or nearly so ; petals $5.5\text{--}7 \times 4.5\text{--}7$ mm. ; plant often robust 3. *M. simplex* (Vahl) Brenan

Leaves, particularly the radical ones, narrow, 1.5-3 (-4) mm. wide ; seeds 1.4-1.6 mm. long, the testa under a $\times 10$ lens conspicuously punctate-verruculose ; petals $5\text{--}6 \times 3.8\text{--}4$ mm. ; plant slender 4. *M. stictosperma* Brenan

1. *Murdannia clarkeana* Brenan, sp. nov. ; *M. semitereti* (Dalz.) Brenan proxima, habitu nonnunquam rhizomatoso, pedicellis multo longioribus, floribus praesertim petalis filamentisque duplo vel triplo majoribus, stylo triplo longiore facile distinguenda ; ob inflorescentiam *M. koenigii* (Wall. ex C. B. Cl.) Brückn. speciem indicam revocans, foliis angustissimis basim versus margine glabris nec ciliolatis vaginis foliarum bracteolarumque clausis nec fere ad basim apertis, filamentis glaberrimis, valvis capsulae apice retusis nec acuminatis, seminibus pro loco paucioribus longe distat.

Herba perennis, gracilis, omnino glabra, caespitosa vel rhizomatosa, 15-30 cm. alta, rhizomate siccitate circiter 0.5 mm. crasso, radices fibrosas et caules erectos numerosos more specierum nonnullarum *Junci* emittens. *Caules* praeter ramos inflorescentiae saepe remotos simplices, nodis remotis, eo basali incluso circiter 4. *Folia* basalia pauca conferta necnon caulina linearia, 6-15 cm. longa, sed illa ante inflorescentiam suam evolvendam marcida, caulina breviora, omnia 1-2 mm. lata, apice acuta, basi in vaginam membranaceam primo clausam 0.6-1.5 cm. longam dilatata. *Inflorescentiae* terminales, satis laxae, irregulares ; rami primarii singulatim usque ternatim ex axillis superioribus exorientes, quibus alii ex mediis et inferioribus nonnunquam additi, 3-7 cm. longi, apicem versus 2-3-furcati, ramulis ultimis tantum floriferis, plerumque leviter curvatis vel flexuosis, inferne nudis, superne laxiuscule floriferis ; bracteolae scariosae, 1.5-3 mm. longae, laxae vaginiformes, apice unilaterialiter acutae et ibi purpura tinctae. *Flores* secundi, racemosim dispositi, purpureo-caerulei, pedicellis 4-13 mm. longis ut videtur purpureis. *Sepala* 3, oblongo-elliptica, 4 mm. longa, 1.8-2 mm. lata, trinervia, hyalina et apice purpura vel caeruleo tincta vel purpurea, obtusa et plus minusve cucullata. *Petala* 3, subaequalia, obovato-elliptica, circiter 6 mm. longa et 3 mm. lata. *Stamina* fertilia 3, filamentis 3 mm. longis antheris oblongo-ellipsoideis 1.7 mm. longis 0.8 mm. latis, staminodiis totidem vitellinis hastatis 2.5 mm. longis filamentis 2.5-

3 mm. longis alternantibus. *Ovarium* glabrum, oblongum, circiter 1.5 mm. longum, 0.7 mm. latum, apice stylo 3 mm. longo. *Capsula* oblonga, pallide brunneo-straminea, valvis 3 aequalibus circiter 3.5 mm. longis 1.5 mm. latis superne divergentibus apice rotundato-retusis. *Semina* 3-5 pro loculo, irregulariter quadrata vel oblonga, 0.7-1.2 mm. longa, 0.8 mm. lata, paulum rugosa, nigro et pallide brunneo minute variegata.

KENYA. Central Province, Nairobi District. Near Nairobi, Aug. 1903, *A. Whyte* s.n. Mbagathi, alt. 2010 m., 13 Mar. 1930, *Miss E. R. Napier* 71 : -swampy ground or damp soil near rivers, soil usually shallow; common in Nairobi District after rain; flowers blue-mauve. Nairobi, alt. 1800 m., 28 Apr. 1930, *Miss E. R. Napier* 138 : -damp rocky ground; herb about 15 cm. high, appearing to creep and throw out rootlets from the nodes; leaves linear, almost round in section; flowers mauve-blue. Mbagathi, Bahati Estate, alt. 1740 m., 22 Dec. 1932, *C. Gilbert Rogers* 218 (Herb. Kew., Mus. Brit.) : -grows in temporary pools in rocks at bottom of a valley, appearing after heavy rains only, and lasting a few weeks; whole plant 15-30 cm. high; rootstock perennial; flowers dark blue. French Mission, Nairobi: slopes of Nairobi R. valley near St. Austin's Mission bridge, alt. 1740 m., 7 May 1950, *R. W. Rayner* 305 (typus in Herb. Kew.) : -on shallow yellowy-red soil overlying lava rock, seasonally waterlogged; part of sparse community of fine-leaved grasses (*Eriogonistis*, *Sporobolus* spp.), *Craterostigma hirsutum*, etc.; low, slightly succulent, tufted herb 10-15 cm. high; main roots somewhat fleshy, up to 3 mm. wide at point of origin, whitish; other roots very fine, pale sepia; rootstock elliptical, between sepia and olivaceous; base of stem white, somewhat swollen, passing upwards through a purplish zone at ground-level, sometimes through a fawn to cinnamon zone, to yellowish pale herbaceous above; nodes tinged vinaceous; leaves herbaceous green, upper branches of inflorescence yellowish herbaceous green tinged purplish; sepals purple in lower half, upper half slightly bluish-green; petals a very slightly mauvish palish violet; filaments of stamens, style, and lower half of staminodial filaments concolorous; upper half of staminodial filaments pallid; stigma pale purple; anthers deep violaceous-black; pollen pale buff; staminodes pale luteous with an obscure luteous band running along the middle of the outside of the lobes and appearing as a blob on the outside of the expanded end of the lobes; ovary flesh-coloured; the style is slightly deflected downwards and the staminode directly below it is free at the base, whereas the rest of the staminodes and stamens are united at the bases for about 1 mm.; ripe capsules deep vinaceous-buff; seeds with a greyish-sepia background largely obscured with small black spots and markings; flowers open from midday until 4 o'clock, when they wither to a mucilaginous mass; no scent. Nairobi District? Kikui, 12 June 1902, *Kaessner* 1017 (Herb. Mus. Brit.).

Some or all of the localities may perhaps be just in Masai Province, the boundary being very close. Mr. R. W. Rayner is to be congratulated on his beautifully collected and pressed type-specimen, and on the excellent and copious notes.

The late Mr. C. B. Clarke had annotated Whyte's specimen as a new species of *Aneilema*, but dissection shows that without doubt it belongs to

the genus *Murdannia*, as emended by Brückner. I have chosen the epithet to commemorate Mr. Clarke's work on the plant and on the family *Commelinaceae* as a whole. Mr. Clarke's name, *Aneilema delicatulum*, has been taken up as a *nomen subnudum*, without any proper description, by Lady Muriel Jex-Blake, *Some Wild Flowers of Kenya*, 113, t. 93 (p. 114) (1948).

The relationship of the new species is obviously with *M. semiteres* (Dalz.) Brenan, discussed elsewhere in this paper, but very clearly differing in the longer pedicels and much larger flowers. In *M. semiteres* the pedicels are 2.5–5 mm. long, the sepals $1.5-1.8 \times 0.8-1.2$ mm., the petals about 2×1.1 mm., the filaments of stamens and staminodes 0.5–1.5 mm. long, the style 1 mm. long; in *M. clarkeana* the pedicels are 4–13 mm. long, the sepals $4 \times 1.8-2$ mm., the petals about 6×3 mm., the filaments of stamens and staminodes 2.5–3 mm. long, the style 3 mm. long. In addition *M. semiteres* appears not to be rhizomatous.

M. clarkeana has a distinct resemblance to the Indian species, *M. koenigii* (Wall. ex C. B. Cl.) Brückn., but the differences, for which see the diagnosis above, are more numerous and of greater significance than those between *M. clarkeana* and *M. semiteres*.

2. *Murdannia semiteres* (Dalz.) Brenan, comb. nov.

[*Aneilema paniculatum* (non Wight)—Wall., Cat., No. 5216 (1831–32), *nomen nudum*; C. B. Cl. in DC., Monogr. Phan. **3**, 215 (1881); Hook. f., Fl. Brit. Ind. **6**, 381 (1892); Cooke, Fl. Bombay, **2**, 790 (1907); C. E. C. Fischer in Gamble, Fl. Madras, 1543, 1546 (1931); Cherfils in Lecomte, Fl. Gén. Indo-Chine, **6**, 893 (1937)].

Commelina nimmoniana Grah., Cat. Pl. Bombay, 224 (1834), *nomen subnudum*, fide Cooke, supra; C. B. Cl. in DC., Monogr. Phan. **3**, 191 (1881); Hook. f., Fl. Brit. Ind. **6**, 374 (1892).

Commelina bulbosa Heyne ex Steud., Nomencl., ed. 2, **1**, 401 (1840), *nomen nudum*.

Aneilema semiteres Dalz. in Hook., Kew Journ. Bot. **3**, 138 (1851); Dalz. et Gibs., Bombay Fl. 254 (1861); Drury, Hand-Book Indian Fl. **3**, 315 (1869).

Dichoespermum juncoides Wight, Ic. Pl. Ind. Or. **6**, 31, t. 2078 (1853).

Dichoespermum semiteres (Dalz.) Hassk., Commelin. Ind. 41 (1870).

Dichoespermum paniculatum Hook. f. et Thoms. ex Hook. f., Fl. Brit. Ind. **6**, 381 (1892), pro synonym.

Phaeneilema paniculatum "(Wall.)" Brückn. in Notizbl. Bot. Gart. Berlin, **10**, 56 (1927).

UGANDA. Eastern Province, Teso District. Serere, alt. 1100 m., Aug.–Sept. 1932, *P. Chandler* 948 :—in uncleared land where vegetation is less thick and grass shorter; in vicinity of rock-outcrops; caespitose; height about 15 cm.; flowers mauve to shade of pale purple, opening between 7 a.m. and 9 a.m. Serere, alt. 1100 m., Aug. 1932, *P. Chandler* 951 :—in uncleared land where vegetation is less thick and grass shorter; height 22–25 cm.; flowers whitish with slight tinge of colour. Amuria, alt. 1130 m., 14 Sept. 1946, *A. S. Thomas* 4533 :—pool in rock; locally abundant succulent herb with white flowers. Busoga District. Bukoli

County : Igui near Buswale, 17 Oct. 1950, *G. Wood* 725 :—growing at margin of shallow pool on ironstone in rich humic silt, sometimes slightly submerged and sometimes forming a green group ; flowers very milky mauve.

KENYA. Rift Valley Province, Trans-Nzoia District. Kitale, Caves of Elgon, *Mrs. D. R. Tweedie* 76 :—found during the rains amongst weeds and grass ; flowers bluish-mauve. S. Elgon, alt. 2040 m., June 1940, *Mrs. D. R. Tweedie* 524 :—in shallow pool on outcrop ; 12 cm. high ; leaves fleshy ; buds greenish-brown ; flowers white. N.E. Elgon, alt. 1860 m., Aug. 1951, *Mrs. D. R. Tweedie* 926 :—small rain-pool in rock in bush community ; see 521, but these flowers were very pale lavender, not quite white. Uasin Gishu District. Kipkarren, 1931, *Mrs. Brodhurst-Hill* 34 :—in or near rock-pools ; height 15 cm. ; flowers mauve ; vernacular name “ Zindugwe ” or “ Chindugwe ”.

TANGANYIKA TERRITORY. Lake Province, Bukoba District. Mshamba alt. 1370 m., Dec. 1931, *A. E. Haarer* 2371 :—plant succulent and growing in very moist places ; flowers white. Lake Province, Mwanza District. Isaka Camp, on the road from Karumo to Geita, alt. 1220–1370 m., 10 Apr. 1937, *B. D. Burtt* 6534 (*Herb. Kew.*, *Herb. Mus. Brit.*) :—in saturated soil on edge of a muddy pool on murram rocks in *Brachystegia boehmii* woodland, a semi-aquatic herb with small blue flowers, local. Central Province, Dodoma District. Kazikazi, Lambo ya Malengali, alt. 1160 m., 17 May 1932, *B. D. Burtt* 3685 :—in moist soil on fringe of seasonal rain-pond, local ; semi-succulent herb.

This odd and interesting plant has a habit reminiscent of *Juncus bufonius*, a resemblance increased by its linear leaves with conspicuous sheaths, and the small laxly cymose-corymbose flowers.

I have dissected flowers of both African and Indian specimens and can see no significant difference between the former and what has in India usually gone under the name *Aneilema paniculatum* Wall. Many of the Indian specimens are dwarf, but the largest from there are as tall as the largest from Africa ; and much variation in size is nothing surprising in a plant with the habitat of *Murdannia semiteres*.

African specimens have the pedicels deflexed after flowering ; but in India various directions from suberect to deflexed may be seen on different specimens, and I cannot attach much importance to this.

The distribution of *Murdannia semiteres* raises various points of interest. Until recently it was only known from India, but was then recorded from Annam by Cherfils, in Lecomte, *Fl. Générale de l'Indo-Chine*, **6**, 893 (1937) ; I have not seen any specimens from here. Now Africa is added as the third disjunct portion of its range.

I see no reason at present to question the nativity of *Murdannia semiteres* in Africa ; but whether Africa is one end a formerly continuous range, perhaps stretching through Arabia and Persia, in most of which climatic changes have eliminated *Murdannia* ; or whether it is a recent introduction, perhaps by water-fowl, I do not know. But it certainly asks questions.

The nomenclature of this species is troublesome. By Indian botanists it has normally been called *Aneilema paniculatum* Wall., *Cat.*, No. 5216 ; but this is a bare name, without any description, and hence invalid. In

1853 Wight, Ic. Pl. Ind. Or. **6**, 31, t. 2075, described and illustrated *Aneilema paniculatum*; Wight wasn't sure whether the plant he was dealing with was the same as Wallich's: he says "ANEILEMA PANICULATA (R.W., an Herb. Wight in Wall. List 5216?)" The plant that Wight described as *A. paniculatum* was in fact not Wallich's plant at all, but a distinct species that Dalzell, two years earlier, had described as *Aneilema dimorphum*; the broader leaves and hairy, not glabrous, filaments to the stamens and staminodes are quite conclusive. Wight did, however, describe what Wallich had originally intended by his *Aneilema paniculatum*, but Wight, in ignorance of this, called it *Dichoespermum juncoides*. All this means then that *Aneilema paniculatum* Wall. must no longer be used, since it was a *nomen nudum*; and that *A. paniculatum* Wight becomes a synonym of *A. dimorphum* Dalz. In fact *Aneilema paniculatum* as a name should disappear altogether.

The earliest valid name for Wallich 5216 appears to be *Aneilema semiteres* Dalz., and this epithet must be adopted under *Murdannia*.

Commelina nimmoniana Grah. is, according to Dalzell & Gibson, and to Cooke, an earlier synonym, but the only account that Graham gave was "a small plant with discoloured linear pointed leaves", which I feel is quite inadequate to pose as a description.

3. *Murdannia simplex* (Vahl) *Brenan*, comb. nov.

Commelina simplex Vahl, Enum. **2**, 177 (1806); Thonning in Schumacher et Thonning, Beskr. Guin. Pl. 22 (1827).

Aneilema sinicum ["sinica"] Ker-Gawl. in Bot. Reg. t. 659 (1822); C. B. Cl. in DC., Monogr. Phan. **3**, 212 (1881); C. B. Cl. in Thiselton-Dyer, Fl. Trop. Afr. **8**, 63 (1901); Hutch. et Dalz., Fl. W. Trop. Afr. **2**, 312, t. 286 (313) (1936).

Commelina sinica (Ker-Gawl.) Roem. et Schult., Syst. Veg., Mant. **1** Addit. 1, 376 (1822).

Aneilema longifolium ["longifolia"] Hook., Exot. Fl. **3**, t. 204 (1827).

Commelina longifolia (Hook.) Spreng., Syst. **4**, Cur. Post. 25 (1827).

Commelina hookerii Dietr., Sp. Pl. **2**, 404 (1833), nom. illegit.

Aneilema simplex (Vahl) Kunth, Enum. Pl. **4**, 71 (1843).

Aneilema sinicum Ker-Gawl. var. *simplex* (Vahl) C. B. Cl. in DC., Monogr. Phan. **3**, 212 (1881).

[*Aneilema giganteum* (non (Vahl) R. Br.)—C. B. Cl. in DC., Monogr. Phan. **3**, 212 (1881), quoad syn. *Aneilema longifolium*, *Commelina longifolia*, *Commelina hookeri*].

Aneilema sinicum Ker-Gawl. var. *longifolium* ["longifolia"] (Hook.) C. B. Cl. in Thiselton-Dyer, Fl. Trop. Afr. **8**, 64 (1901).

Phaeneilema sinicum (Ker-Gawl.) Brückn. in Engl., Bot. Jahrb., **61**, Beibl. 137, 69 (1926); et in Notizbl. Bot. Gart. Berlin **10**, 56 (1927).

Murdannia sinica (Ker-Gawl.) Brückn. in Engl. et Prantl, Nat. Pflanzenf., ed. 2, **15a**, 173 (1930).

There is a considerable purely Asiatic synonymy for this species, that I have not attempted to cite. In Africa it is a common and very widely spread plant from Sierra Leone and the Anglo-Egyptian Sudan in the N. to Angola, Natal and Zululand in the S., and on the whole very uniform except in size.

The name-change is unfortunate but unavoidable. *Commelina simplex* Vahl provides the earliest epithet ; Vahl's and Thonning's descriptions square quite satisfactorily with *Murdannia sinica* ; and C. B. Clarke treated *Commelina simplex* as a variety of *Aneilema sinicum*. In addition, due to the kindness of the authorities of the Museum Botanicum Hauniense, I have been able to see the type-specimen of *Commelina simplex*, collected by Thonning in "Guinea", and it is unquestionably conspecific with *Aneilema sinicum*.

Aneilema sinicum is often attributed to Lindley ; but, according to Britten and Boulger, Biogr. Index Brit. & Irish Bot., ed. 2, revised by Rendle, 172 1931, Ker-Gawler edited the Botanical Register until 1824, and the unsigned articles in the transition period appear to be by Ker-Gawler and not Lindley. I am indebted to my colleague, Mr. J. R. Sealy, for help over this matter.

The staminal arrangement of this species has caused trouble. The original *A. longifolium* was illustrated as having 3 fertile stamens, and C. B. Clarke describes *A. sinicum* var. *longifolium* as having "fertile stamens commonly 2, but sometimes 3". I have dissected a bud from the type-specimen of *A. longifolium*, which shows the antesealous stamens represented by 2 fertile ones and one hairy staminode. I have seen this repeatedly in *M. simplex* and believe it to be the normal and constant arrangement. I cannot help suspecting that Sir Wm. Hooker's artist for *A. longifolium* saw the hairy staminode and assumed that an anther had dropped off, or else felt that an antherless staminode was an offence against artistic symmetry. That some such falsification did take place is made more probable by the fact the artist also juggled with the insertion of the filaments, causing the three fertile ones to be inserted anticously and the three staminodes posticously, as thought the plant were an *Aneilema* and not a *Murdannia* ! Ker-Gawler (*l.c.*) described the staminal arrangement carefully and exactly ; unfortunately again the artist came unstuck and strangely omitted the hairy staminode—the 'tertium castratum' of Ker-Gawler's description—from the enlarged flower, though I believe I can discern it shyly and minutely peeping from one of the flowers on the inflorescence. An exactly similar omission is on t. 286 (p. 313) of the second volume of the Flora of West Tropical Africa (1936).

I thus believe that there is no justification for separating *A. longifolium* from *Murdannia simplex*, even as a variety. The alleged difference in size of parts is utterly worthless.

There is a good deal of variation in the hairiness of the sheaths in *M. simplex*. They may be glabrous except on the free margins and for a line of hairs from the mouth to the base of the sheath on the side opposite to the insertion of the lamina ; or the whole sheath may be more or less densely clothed with rather long whitish spreading hairs. The types of *Commelina simplex* and *Aneilema longifolium* show the first condition. I consider that these extremes come within the normal variation of the species, and that it is inadvisable to make varieties.

4. *Murdannia stictosperma* Brenan, sp. nov. ; *M. simplici* (Vahl) Brenan affinis sed omnino graciliora, foliis angustis 1.5-3 (-4) mm. tantum latis, seminibus paulo minoribus 1.4-1.6 mm. tantum longis sublente $\times 10$ conspicue punctato-verruculosis differt.

Herba perennis, gracilis, marginibus foliorum et vaginarum exceptis fere glabra, simplex vel laxe caespitosa, haud rhizomatosa, 18-30 cm. alta; radices primariae paulum tantum incrassatae, siccitate 1(-2) mm. crassae. *Caules* basi bulbiformiter incrassati, praeter ramos inflorescentiae simplices, siccitate circiter 1 mm. diametro. *Folia* plerumque basalia, circiter 2-5 ibi aggregata, linearia (4-5-) 7-18 cm. longa, 1.5-3 (-4) mm. lata, apice acuta, basi in vaginam primo clausam dilatata, caulina 2-3, suprema reducta; margines foliorum basim versus et vaginarum ciliati. *Inflorescentiae* terminales, satis parvae, 2 3.5 cm. longae, circiter 1-2 cm. latae, e ramis brevibus 2-3 inferne saepe laevibus superne cicatricibus confertis more *M. simplicis* notatis compositae; rhachis inflorescentiae saepe sed haud semper flexuosus, ramos singulatim vel nonnunquam geminatim emittens; bracteolae scariosae, 4-6 mm. longae, 3 mm. latae, ovatae, uninerviae, valde concavo-convexae, apice obtuse cucullatae, extra ut sepala pilis glanduliferis perpaucis nonnisi vivis vel spiritu conditis aegerrime cernendis more *M. simplicis* ornatae. *Flores* secundi, racemosim dispositi, pallide purpurei, pedicellis 4-6 mm. longis basi articulatis. *Sepala* 3, ovato-oblonga, 5 mm. longa, 2-2.5 mm. lata, 3 (-4)-nervia, apice paulum incrassata, obtusa et plus minusve cucullata. *Petala* 3, subaequalia, late obovato-elliptica, 5-6 mm. longa, 3.8-4 mm. lata, apice rotundata. *Stamina* fertilia 2, antesepala, filamentis 5 mm. longis longe barbatis, antheris ellipsoideis 1.5 mm. longis, 1.2 mm. latis; stamen tertium antesepalum staminodiale filamentis barbato 2.5 mm. longo in corpusculum minimum desinente; staminodia antepetala 3, filamentis 2 mm. longis glabris apice corpusculis 3 coronatis. *Ovarium* glabrum, oblongo-ellipsoideum, 2 mm. longum, 0.8 mm. latum, apice stylo 3.5 mm. longo. *Capsula* subglobosa, straminea, valvis 3 aequalibus circiter 5 mm. longis 2.5-3 mm. latis superne divergentibus apice apiculatis. *Semina* 2 pro loculo, irregulariter angulato-ellipsoidea, 1.4-1.6 mm. longa, pallide brunnea, punctato-verruculosis, verruculis in lineas transversas plus minusve ordinatis.

NORTHERN RHODESIA. Mwinilunga District. S. of Matonchi Farm at edge of *Brachystegia* woodland and "lateritic" grassland, 20 Nov. 1937, E. Milne-Redhead 3331 (typus in Herb. Kew.):—perennial; base bulb-like; roots not very thick; leaves rather narrow, green; petals more or less equal, dull mauve; filaments with mauve hairs.

This plant is closely and obviously related to *M. simplex*, having an identical androecial structure. The outstanding features are the very narrow leaves, particularly the radical ones, the smaller punctate-verruculose seeds, and the more slender habit. In *M. simplex* the leaves are (3-) 4-12 mm. wide and the seeds 1.6-2 mm. long, showing minute whitish pustules when viewed under a lens but relatively smooth and decidedly not with the close rather raised tubercles separated by impressed areas shown by the seeds of *M. stictosperma*.

There is a specimen in the Kew Herbarium, collected in 1896 by W. H. Nutt at Kambole S.W. of L. Tanganyika, alt. 1520 m. This has the narrow foliage of *M. stictosperma*, but is taller, almost 40 cm. high; I expect that it will prove conspecific, but as it is only in flower, I prefer to leave it doubtful at present. *Kaessner* 2411 from the Kushiba River (probably in the Katanga), 27 Jan. 1908 (Herb. Mus. Brit.) is also perhaps conspecific.

5. *Murdannia nudiflora* (Linn.) Brenan, comb. nov.

Commelina nudiflora Linn., Sp. Pl. 41 (1753), pro parte, vide Merrill in Journ. Arn. Arb. **18**, 64—66 (1937).

Aneilema nudiflorum (Linn.) Wall., List 182, no. 5224 (1830).

Murdannia malabarica (Linn.) Brückn. in Engl. et Prantl, Nat. Pflanzenfam. ed. 2, **15a**, 173 (1930).

Phaeneilema malabaricum ["malabarica"] (Linn.) Narayanaswami ex Biswas in Ind. For. Rec., n.s., Bot., **3**, 55 (1941) ; Raizada in Indian Forester, Sept. **1948**, 335 (1948).

SIERRA LEONE. Southern Province, Moyamba District. Njala, 15 Aug. 1946, *F. C. Deighton* 4360 :—weed in garden introduced with soil brought in from neighbouring forest ; prostrate, with decumbent flowering stalks ; flowers rather pale blue. Njala, 30 Aug. 1949, *F. C. Deighton* 5153 :—garden weed ; blue flowers. Northern Province, Port Loko District. Kase chiefdom, Romeni, 4 Oct. 1949, *H. D. Jordan* 360 :—by roadside near stream ; white flowers.

I do not consider that these plants can be separated from the very widespread Asiatic species usually hitherto known as *Aneilema nudiflorum*. The leaves of Mr. Deighton's plants are more hairy than usual, but can be matched in Asia, particularly among those robust forms of *A. nudiflorum* included under the var. *terminale* (Wight) C. B. Cl. Mr. Jordan's gathering on the other hand, is of the small-leaved and more slender form that is more commonly collected in Asia.

Murdannia nudiflora has not been found in Africa hitherto, and its status must, in the circumstances, be rather doubtful.

For a detailed discussion of the typification and identity of *Commelina nudiflora* Linn., the basynym of *Murdannia nudiflora*, see Merrill in Journ. Arn. Arb. **18**, 64—66 (1937) ; here also the reader will find additional synonymy of *Murdannia nudiflora* ; and there is yet more by C. B. Clarke in DC., Monogr. Phan. **3**, 210 (1881).

6. *Murdannia allardi* (De Wild.) Brenan, comb. nov.

Aneilema allardi De Wild. in Bull. Jard. Bot. Brux. 5, 83 (1915).

This very remarkable species, still only known from the type-gatherings from the Kisantu region of the Belgian Congo (*Allard* 259 !, 517 !), is far more distinct from *M. simplex* (*Aneilema sinicum*) than De Wildeman made out. The interruptedly verticillate inflorescence, the broad leaves, and the antesepalous stamens represented only by two fertile ones with glabrous filaments, and no staminode occupying the place of the missing third member of the whorl, are characters unique among the African species of *Murdannia*.

7. *Murdannia tenuissima* (A. Chev.) Brenan, comb. nov.

Baoulia tenuissima A. Chev. in Bull. Soc. Bot. Fr. **58**, Mém. 8, 217 (1912).

Aneilema tenuissimum ["tenuissima"] (A. Chev.) [A. Chev., Expl. Bot. Afr. Occ. Franç. **1**, 668 (1920), nomen nudum ;] A. Chev. ex Hutch. et Dalz., Fl. W. Trop. Afr. **2**, 314 (1936).

This exceedingly distinct but inconspicuously grass-like species has a

wide but at present discontinuous distribution, due probably to the fact that it must be often overlooked. It is known from the Ivory Coast (*Chevalier* 22318, the type-number of the species), Nigeria (*Keay* FHI. 28037), Uganda (*Chandler-Hancock* 4, 91, *Eggeling* E. 2244) and Angola (*Gossweiler* 2372). Field-notes indicate that it is a plant of swamps and marshes.

M. tenuissima is outstanding in having the androecium composed only of the three fertile antesealous stamens, staminodes being absent, a condition I have otherwise met with only occasionally in *M. semiteres* among the African species of *Murdannia*.

ANEILEMA R.Br.

Aneilema hockii *De Wild.* in Fedde, Repert. **12**, 290 1913 ; Contrib. Fl. Katanga, suppl. **3**, 86–87 (1930).

Aneilema aequinoctiale (P. Beauv.) Kunth var. *kirkii* C. B. Cl. in DC., Monogr. Phan. **3**, 222 (1881).

[*Aneilema aequinoctiale* (non (P. Beauv.) Kunth)—auct. pro parte, e.g. C. B. Cl. in Thiselton-Dyer, Fl. Trop. Afr. **8**, 65 (1901), pro parte].

A. hockii *De Wild.* a *A. aequinoctiale* (P. Beauv.) Kunth praesertim distat floribus semper caeruleis vel albo-caeruleis nec luteis, capsula superficie sub lente valido visa cellulis angustissimis transverse elongatis notata et haudquaquam ut in *A. aequinoctiale* cellulis rotundatis prominulis ut videtur minute papillosa distat ; praeterea foliis plerumque lanceolatis nec ovatis, ramis lateralibus inflorescentiae plerumque magis verticillatis, capsulis glabris vel sparsius hirtellis, valvis medio apicis haud apiculatis differt.

BELGIAN CONGO. Haut Katanga. Elisabethville, 1911, *A. Hock* s.n. (typus *A. hockii* in Herb. Brussels, photo, in Herb. Kew.). Ferme Hubert Droogmans, 14 Dec. 1927, *P. Quarré* 950 (Herb. Brussels, not seen).

KENYA. Northern Province. ? Turkana or Northern Frontier District. Leroghi Plateau, alt. 1830 m., 30 Sept. 1935, *Mrs. D. Leakey* 8526 :—on rocky hillock ; delicate herb 60 cm. high ; stems green, purple at top, with red lines at junction of leaves ; flowers pink-mauve. Rift Valley Province, Baringo District. Baringo, alt. 1040 m., Mar. 1901, *Sir H. H. Johnston* s.n. :—stems green ; flowers French Blue ; stamens yellow. Central Province, Embu District. Embu, Itawba, alt. 1190 m., 6 Apr. 1932, *W. O. Sunman* 2215 :—small upright herb, hirsute and slightly clinging ; small bluish flowers ; vernacular name (Kiembu) “Kigangeria”. Emberre, Itabwa, marshy land, alt. 1160 m., 28 Sept. 1932, *N. D. Graham* 2246 :—stems 1.5 m. long, reclining, assurgent, prostrate, succulent ; pale mauve to white ; no scent ; vernacular name (Kubwa) “Kimori”. Machakos District. Ukambani, Kibwezi, alt. c. 1000 m., 28 Jan. 1906, *G. Scheffler* 112 :—dry sunny grassland, on red loam with lava. Kibwezi, plains, alt. 910 m., 18 Apr. 1938, *P. R. O. Bally* 8319 :—in bush country ; growing in communities ; flowers white. Garabani Hill, alt. 1490 m., 20 Mar. 1940, *Dr. van Someren* 162 :—in grassland in shade of trees ; small herb ; flowers blue. Nairobi District. Athi Plains, game reserve, alt. 1680 m., 20 June 1934, *E. R. Napier* 6822 :—growing in swampy ground ; stem and leaves sticky ; flowers pale mauvy-blue ; stamens very long. Kitui District. Kitui,



Aneilema hockii De Wild. 1, plant reduced to $\frac{1}{2}$ of natural size ; 2, habit, natural size ; 3, flower, $\times 2$; 4, sepal, $\times 2$; 5, petal, $\times 2$; 6, petal (lower) $\times 2$; 7, antepetalous stamen, $\times 4$; 8, antesepalous staminode, $\times 4$; 9, antepetalous staminode, $\times 4$; 10, anther of antesepalous stamen, $\times 4$; 11a, seed, $\times 6$; 11b, seed (different view), $\times 6$; 12, fruit, $\times 3$; 13, portion of valve, much enlarged ; 14, flower beginning to fade, 2 hours after opening.

Aneilema aequinoctiale (P. Beauv.) Kunth. 15, valve, $\times 3$; 16, portion of valve much enlarged.

March 1877, *J. M. Hildebrandt* 2641 :—in damp grassland. Masai Province. Ngong area, alt. 1830 m., Aug. 1934, *C. van Someren* 6347 :—in grassland at foot of Ngong Hills and on shoulder ; erect herb about 30 cm. high ; flowers mauvy-blue. Coast Province, Teita District. Maungu, alt. 610 m., *H. H. Johnston s.n.* Teita Hills, alt. 610 m., *A. P. Grenfell s.n.* Voi, on edge of scrub, alt. 610 m., 6 May 1931, *E. R. Napier* 915 :—sometimes erect, usually decumbent herb ; petals bluish-mauve, white at base, 1.2–1.8 cm. long, third petal nearly 1.2 cm. long, mauve, concave ; backs of leaves and stems a little scabrid. Province and district uncertain. Without locality, *E. R. Napier* 302 :—herb with pale mauve-blue flowers, growing in damp places. S. Leroki Hills, Oct. 1935, *D. G. B. Leakey* (24) 3464 [both numbers on label] :—herb 75 cm. high ; flowers mauve.

TANGANYIKA TERRITORY. Lake Province, Shinyanga District. Shinyanga, in fairly open marshy ground, Jan., Feb. and Mar. 1932 3, *Romola D. Bax* 367 :—30–60 cm. high ; flowers blue-mauve. Northern Province, ? Mbulu or Masai District. N.E. of Lake Eyassi, alt. 1520 m., 22 Mar. 1937, *Mrs. J. Fosbrooke* 101 :—about 1 m. high with broad leaves and dark blue flowers ; vernacular name (Kimasai) “Engaiteteyai”. Moshi District. Kiruru, Upare, Moshi, near swamp, alt. 790 m. Apr. 1927, *A. E. Haarer* 452. Engare Nairobi, alt. 1520 m. 19 June 1944, *P. J. Greenway* 6863 :—locally dominant in *Bidens schimperi*, *B. pilosa*, *Acalypha indica*, *Erlangea calycina*, *Stachys hildebrandtii* association with *Commelina*, *Berkheyopsis diffusa*, *Monsonia biflora*, *Corchorus trilocularis* and *Sida* on a black cracking clay of volcanic derivation under first cultivation with 192 wheat. Tanga Province, Pare District. Kisuani-Same, E. S. Pares, in grassland, alt. 910 m., 7 Feb. 1930, *Greenway* 2185 (Herb. Kew. & East African Herb.) :—beautiful blue-flowered perennial herb up to 1 m. high. Lushoto District. W. Usambaras, Mombo-Wilhelmstal, 26 Dec. 1912, *Grote* 3894 (East African Herb.). E. Usambaras, Monga, in grassland, 21 Oct. 1910, *Zimmermann* 8229 (East African Herb.) :—flowers bright blue. Makuyuni, alt. 400–1000 m., June 1935, *Koritschoner* 759 (Herb. Kew. & East African Herb.) :—root for birth ; vernacular name (Kingoni) “Mkwani”. Same locality, altitude and date, *Koritschoner* 1146 (Herb. Kew. & East African Herb.) :—leaves for an itch ; vernacular name (Kisukuma) “Itizi ingosha”. Mombo-Makuyuni, alt. 360 m., 11 Sept. 1935, *Greenway* 4075 (Herb. Kew. & East African Herb.) :—growing in association with *Indigofera* and *Echinochloa* on a black cotton soil, not very common ; perennial herb with fleshy hairy stems and much branched panicles of mauve flowers. Central Province, Kondo District. Simbo Hills, alt. c. 1400 m., 14 Mar. 1928, *B. D. Burt* 1730 :—blue-flowered herb in reddish sandy soil on rocks in *Isobertia* savannah ; vernacular name (Swahili) “Congwe”. Dodoma District. Kikomba, 8 Mar. 1924, *F. R. Durham s.n.* :—flowers blue. Mpwapwa District. Mpwapwa, alt. 1370 m., 7 Mar. 1935, *Mr. & Mrs. Hornby* 715 :—herb with blue flowers fairly common in *Isobertia-Brachystegia* woodland. Eastern Province, Kilosa District. Tembo, alt. 760 m., Jan. 1931, *A. E. Haarer* 1997. Rufiji District. Rufiji, alt. 15 m., 23 Jan. 1931, *H. Musk* 97 :—common in light shade on red sandy soils ; erect herb 30–60 cm. high ; flowers mauve ; a medicine for colds ; vernacular name “Kongwa dume”. Southern Highlands

Province, Iringa District. Iringa, Mt. Tarik, alt. 1830 m., only one seen, 17 Feb. 1932, *Rear-Admiral H. Lynes* l.h. 109. Iringa, Mt. Mferu, alt. 1920 m., 22 Mar. 1932, *Rear-Admiral H. Lynes* l.h. 254. Southern Province, Lindi District. Ruponda, alt. 520 m., 12 Dec. 1948, *B. Anderson* 246 :—herb 30–45 cm. high ; corolla and stigma purple.

PORTUGUESE EAST AFRICA. Cabo Delgado Province, Moçimboa da Praia District. W.S.W. of Moçimboa, Jan. 1907, *J. Stocks* 110. Msalu River, Jan. 1912, *C. E. F. Allen* 138. Niassa Province, Metonia District. Mandimba, 10 Jan. 1942, *Mr. A. J. W. Hornby* 4485 :—herb in open woodland, frequent, sometimes gregarious on good soil. Moçambique Province, Malema District. Near Malema, lat. 15° 5' S., long. 37° 20' E., alt. 700 m., *Gomes y Sousa* 878 :—flowers bluish. Zambesia Province, Tete District. Tete Hill, Feb. 1861, *Sir John Kirk* s.n. Lugela District. Namagoa estate near Mocuba, alt. 60–120 m., 1944, *Mrs. H. G. Faulkner* 276 (*Pretoria No.*) :—growing in forest, common in some areas ; flowers very pale blue (skim milk), quite beautiful, opening in the morning. Same locality, 31 Dec. 1948, *Mrs. H. G. Faulkner* 194 (*Kew. No.*). Manica e Sofala Province, Sena District. Near Sena, 3 Jan. 1860, *Sir John Kirk* s.n. Chupanga District. Chupanga, Jan. 1859, *Sir John Kirk* s.n. Same locality, in damp spots, 10 Jan. 1863, *Sir John Kirk* s.n. (lectotypus of *Aneilema aequinoctiale* var. *kirkii*, in *Herb. Kew.*).

NYASALAND. Blantyre District. Mount Soche, Dec., *Scott Elliot* 8527. Cholo District. Cholo Hill, alt. 1220 m., *G. Adamson* 156. District doubtful. Road from Missale to Linga, March 1897, *Dr. J. G. Nicholson* s.n. Without locality, *J. Buchanan* 510, *J. Buchanan* 1401.

SOUTHERN RHODESIA. Plumtree District. Sangaluba Camp, alt. 910–1220 m., Mar. 1949, *R. M. Davies* 38 (*Govt. Herb. No.* 23129) :—on heavy loam in *Acacia*-Mopane veld ; procumbent or straggly ; flowers mauve. Salisbury District. Hunyani R., alt. 1370 m., 22 Feb. 1950, *H. Wild* 3228 (*Govt. Herb. No.* 26904) :—among granite rocks ; straggling herb 60–90 cm. high ; leaves somewhat viscid ; sepals green with broad purplish striations ; petals mauve. Cleveland Dam, alt. 1370 m., 3 Mar. 1950, *H. Wild* 3235 (*Govt. Herb. No.* 27080) :—in shade among granite rocks ; viscid herb to 1 m., straggling ; flowers pale blue-mauve. Marandellas District. S. Marandellas, Jan. 1931, *Miss R. J. Myres* 186. Makoni District. Rusapi, *A. Hislop* Z. 249. Rusape, alt. 1370 m., 5 Feb. 1949, *R. C. Munch* 156 (*Govt. Herb. No.* 22654) :—semi-decumbent ; flowers pale mauve. Umtali District. Odzani River Valley, 1915, *A. J. Teague* 542, 544. Umtali, 26 Mar. 1932, *Eyles* 7088 :—lax herb up to 1.5 m. tall among rocks, tall grasses, etc. ; flowers nearly white but faintly tinted smoke-blue. Charter District. Buhera, 15 May 1923, *J. A. S. Walters* 3259 :—“ Bug-trap plant ”. District doubtful. Matabele Land, *W. Elliot* s.n. Between Salisbury and Bulawayo, Nov. Dec. 1899, *Hon. Mrs. Evelyn Cecil* 81 :—flowers mauve.

BECHUANALAND. N.E. edge of Makarikari, 12 Dec. 1925, *I. B. Pole Evans* 2593.

NORTHERN RHODESIA. Abercorn District. Abercorn Lake, alt. 1615 m., 19 July 1930, *J. Hutchinson & J. B. Gillett* 3884 :—among *Uapaca* ; flowers pale blue. Mumbwa District. Mumbwa, *Mrs. Macaulay* 1056.

[SOUTH WEST AFRICA. Amboland, *M. Rautanen* 292 ; specimen too

incomplete for certain naming, but cited as it is the only evidence for *A. hockii* in this territory].

TRANSSVAAL. Pietersburg District? Houtbosch, *A. Rehmann* 5759; district doubtful, as there are two other Houtbosches in the Transvaal. Marico District? In Bush near Mailas Kopje, alt. 800 m., 4 Mar. 1894, *R. Schlechter* 4565. Barberton District. Barberton, Rimer's Creek, alt. 910 m., Feb. 1890, *G. Thornecroft* 265 :—flowers blue. Barberton, near Sheba Battery, alt. 609 m., Dec. 1890, *E. E. Galpin* 1186 :—hillside among rocks in damp shady places.

Aneilema hockii has been hitherto known from only two specimens from the Katanga, and the sudden and spectacular increase in range given here requires some comment. The main theme running through its history is one of incessant confusion with *A. aequinoctiale* (P. Beauv.) Kunth. The two are really very distinct, the main points being given in the diagnosis following the synonymy. The most obvious difference in the living state is the colour of the flowers—in *A. hockii* blue to whitish with blue tinge, in *A. aequinoctiale* yellow, and there is no evidence for any greater variation. In the herbarium the very satisfactory and precise difference in the surface of the capsule will often be found more serviceable; in *A. hockii* the surface is composed of very narrow cells elongated transversely and arranged in rather irregular vertical files, while in *A. aequinoctiale* the cells are rounded and rather prominent, giving a beaded-papillose look. I should emphasise that a lens giving a magnification of $\times 20$ or more must be used here, but this character is so precise and constant that the two species can be then separated at a glance. There are other less definite distinctions in the leaves, inflorescence and capsule, for which the reader may consult the diagnosis.

Now, why was *A. hockii* confused with *A. aequinoctiale* in the first place? The first and perhaps main culprit was Palisot de Beauvois himself, for in his plate of *Commelina equinoctialis* in *Fl. d'Oware et Benin* **1**, t. 38 (1809) the flowers are painted bright blue. Through the courtesy of the Director of the Conservatoire et Jardin Botanique de Genève, I have seen Palisot de Beauvois' type-specimen of *Commelina equinoctialis* and though it has lost its colour and there are no notes, the capsule and habit make it certain that it is the common yellow-flowered species of West Africa that has been normally called *Aneilema aequinoctiale*. In fact Beauvois' colourist blundered, and unfortunately not only here. To take only a few random examples: the pale yellow flowers of *Leonotis africana* are (t. 61) painted bright mauve-blue; the vivid orange flowers of *Lankesteria elegans* are bright pink on t. 50; the ravishingly lovely white flowers of *Caloncoba glauca* are "improved" on t. 17 to a gaudy crimson, against which we find as early as 1868 Oliver protesting (*Fl. Trop. Afr.* **1**, 117: 1868): "the colour of the flower and cross-section of the ovary are purely imaginary"; and finally those ultramarine-blue flowers of *Napoleona imperialis* on t. 78 impose a severe strain on my credulity. In fact, whatever the reason—loss of notes or forgetfulness by Beauvois, or just plain dishonesty—his colourist was evidently allowed ample scope for artists' licence, and the results, though undeniably artistically decorative and a delight to the bibliophile, are often simply products of the imagination and sadly misleading to the botanist. The plates in the *Flore d'Oware et*

Benin should not be accepted as evidence for colour without outside confirmation.

Thus, quite wrongly, the flower-colour of *A. aequinoctiale* was assumed to vary from yellow to blue. In 1881 C. B. Clarke separated specimens of *A. hockii* as *A. aequinoctiale* var. *kirkii*, though he missed the differences in flower-colour and capsule-shape, and seems to have thought so little of his variety that in his later treatment in the Flora of Tropical Africa it is entirely suppressed, even in synonymy, and the specimens return to the general mass under *A. aequinoctiale*. And so, since then, the position has remained. I have little doubt that the specimens from Inyanga and Makoni in Southern Rhodesia, cited by Norlindh & Weimarck in Bot. Notiser **1948**, 24 (1948) under *A. aequinoctiale*, are really *A. hockii*, since they are described as blue-flowered, but I have not seen them and therefore have omitted this reference from the bibliography. The same applies to the pale lilac-flowered *A. aequinoctiale* recorded from Javello in Abyssinia by Chiovenda in Miss. Biol. Paese dei Borana **4**, 304 (1939).

I have not yet seen the type-specimen of *Aneilema wildii* Merxm. apud Suesseng. et Merxm. in Trans. Rhod. Sci. Ass. **43**, 78 (1951), but the description, with the sole exception of the capsule loculi which are described as 2-4-seeded, exactly agrees with that of *A. hockii*. The type-locality of *A. wildii* is Marandellas in Southern Rhodesia, where *A. hockii* has also been collected.

Aneilema hockii is widely distributed in East Africa, ranging from Kenya to the Transvaal, but so far quite absent from West Africa. *A. aequinoctiale* has a much wider range, being common both in East and West Africa, and extending south to the Transvaal. I believe that the two species will prove to have different climatic requirements. *A. aequinoctiale* seems restricted to high-rainfall areas supporting forest, while *A. hockii* seems a plant of the savannah regions, with a considerably lower rainfall. In South Africa *A. aequinoctiale* has been repeatedly collected in Natal but not in the Transvaal, while there are several sheets of *A. hockii* from the Transvaal and none from Natal.

I must here thank Mr. P. J. Greenway, of the East African Agriculture and Forestry Research Organisation, Nairobi, Kenya, who kindly sent me material of *A. hockii* and *A. aequinoctiale* on loan.

Aneilema petersii (Hassk.) C. B. Cl. in DC., Monogr. Phan. **3**, 225 (1881); C. B. Cl. in Thiselton-Dyer, Fl. Trop. Afr. **8**, 70 (1901).

Lamprodithyros petersii Hassk. in Peters, Reise Mossamb., Bot. 529 (1863).

Aneilema tetraspermum K. Schum. in Engl., Pflanzenw. Ost-Afr. **C**, 136 (1895).

Aneilema sacleuxii Hua in Bull. Mus. Nat. Hist. Nat. Paris **1**, 121 (1895); C. B. Cl. in Thiselton-Dyer, Fl. Trop. Afr. **8**, 74 (1901).

The type of *A. sacleuxii* Hua (*Sacleux* 1192 from Zanzibar), a species regarded by Clarke as insufficiently known, has been kindly sent on loan by the Muséum d'Histoire Naturelle at Paris, and it is obviously conspecific with *A. petersii*, which is now known from Kenya, Tanganyika Territory, Zanzibar and Portuguese East Africa.

Aneilema rendlei C. B. Cl. in Thiselton-Dyer, Fl. Trop. Afr. **8**, 68 (1901), *descr. ampl.*

Aneilema octosperma C. B. Cl., MS., ined.

A. dregeano Kunth persimilis, inflorescentiis sepalis filamentis staminum fertilium lateralium capsulis omnibus glabris, seminibus pro capsula numerosioribus differt; *A. umbroso* (Vahl) Kunth etiam afinis, axibus inflorescentiarum et filamentis glabris, floribus et capsulis majoribus differt.

Herba perennis, caulibus prostratis vel adscendentibus usque ad 90 cm. longis, radicibus omnibus fibrosis e nodis infimis emissis. *Caulis* basi geniculati, inconspicue pubescentes vel glabri, e basi crebre ramosi. aliter praeter inflorescentias simplices vel subsimplices, siccitate sulcati et satis graciles, 1-2 (-4) mm. diametro. *Folia* ovata ovato-elliptica vel late lanceolata, 3.5-11 cm. longa, 1-4.8 cm. lata, pilis longiusculis tenuibus albidis crebris vel sparsis cum aliis brevissimis perminimis satis dense commixtis utrinque sed praesertim subtus pubescentes, apicem attenuato-acutum versus sensim angustata, margine minutissime denticulata vel ciliolata, basi cuneata vel rotundata et plerumque in "petiolum" 0.3-2 cm. longum margine plus minusve longiciliatum angustata; vagina tenuis, laxa, pallida, clausa, 4-24 mm. longa, 2-6 mm. diametro, extra pilis brevissimis puberula, nonnunquam aliis longis commixtis, ore longiciliato. *Inflorescentiae* terminales, glaberrimae, laxae vel paulum contractae, quibus aliae paucae laterales reductae ex axillis superioribus exorientes raro additae sunt, circiter (1-) 2-5 cm. longae, 1-4 cm. latae, subpyramidales usque oblongae; ramuli laterales inflorescentiae circiter 0.5-3 cm. longi, basi bractea axi inserta ovato-triangulari 1.5-2 mm. longa basi 1.5 mm. lata apice incrassato subcucullato-obtusa suffulti, superne bracteolis 2-7 oblique vaginato-amplexicaulibus 1-2 mm. longis albo-viridibus obtusis. *Flores* secundi, pallide lilacini vel rosei; pedicelli 3-7 mm. longi, tenues, glaberrimi, basi articulati. *Sepala* 3, rotundato-elliptica, glabra, 3 mm. longa, 2 mm. lata, apice incrassato subcucullato-obtusa. *Petala* 3, duo postica 8.5 mm. longa unguiculo 4 mm. longo 0.7 mm. lato lamina 4.5 mm. longa, 4 mm. lata obtusa, unum anticum ovatum basi angustatum sed vix unguiculatum 4.5 mm. longum 3.5 mm. latum. *Stamina fertilia antica*: duo lateralia caerulea filamentis glabris 6-7 mm. longis, antheris oblongo-ellipsoideis 1.5-1.7 mm. longis 0.7-1 mm. latis; unum centrale filamentum glabro 4.5 mm. longo, anthera lutea 1.5-2 mm. longa 1.2-1.5 mm. lata. *Staminodia postica*: duo lateralia filamentis glabris 5 mm. longis apice bifidis ramis 1 mm. longis utroque ramo in corpusculum luteum reniforme 0.6 mm. longum 0.7 mm. latum desinente; unum centrale filamentum glabro 1.5 mm. longo, apice bifido, utroque ramo 0.5 mm. longo apice corpusculo reniformi luteo 0.7 mm. longo 1.5 mm. lato. *Ovarium* glabrum, 1.8 mm. longum, 0.8 mm. latum, apice stylo glabro violaceo 7.5 mm. longo. *Capsula* bivalvata, straminea, nitida, oblonga, raro ellipsoidea (4-) 5-7 mm. longa, 2.5-3 mm. lata, apice emarginulata. *Semina* plerumque 6-8 pro capsula, raro (abortione?) 4-5 tantum, obtuse trilobulata vel quadrata, straminea, rugulosa, circiter 1.8 mm. longa et lata.

SOMALILAND. Without precise locality, 23 Apr. 1895, *A. Donaldson Smith s.n.* (typus in Herb. Mus. Brit.).

KENYA. Central Province, Machakos District. Kibwezi, alt. 915 m., Jan. 1922, *R. A. Dummer* 5020 :—on rocky outcrops ; flowers pale lilac-blue. Coast Province, Teita District. Teita Hills, alt. 610 m., 20 Mar. 1906, *A. P. Grenfell s.n.* Voi, alt. 610 m., 6 May 1931, *E. R. Napier* 914 :—edge of scrub and bush ; slightly decumbent herb ; leaves and stems green ; flowers mauve ; petals with claw about $\frac{1}{4}$ in. long, one petal small, concave, green, transparent.

TANGANYIKA TERRITORY. Northern Province, Moshi District. Chala Crater, 18 Dec., *Geilinger* 4783 :—flowers lilac. Tanga Province, Pare District. Kiruru, alt. 915 m., Apr. 1927, *A. E. Haarer* 447. Kiruru, alt. c. 790 m., May 1928, *A. E. Haarer* 1445. Kisuani—Same, E. S. Pares, 7 Feb. 1930, *Greenway* 2193 :—perennial prostrate herb with shell-pink flowers forming dense stands near roadside in *Acacia* Desert Grass country. Lushoto District. Amani, alt. 915 m., 22 Aug. 1929, *Greenway* 1668 :—perennial prostrate herb with mauve-pink flowers, growing on red soil as the first invader in a cleared area in evergreen rain-forest. W. slope of Mt. Mlinga, E. Usambaras, alt. 610 m., 4 Dec. 1940, *Greenway* 6058 :—a perennial succulent herb with procumbent and ascending stems up to 90 cm. tall and small mauve stalked flowers ; local in shade on a pathside with *Sacciolepis curvata* in *Parinari excelsa*, *Funtumia latifolia*, *Sterculia appendiculata*, *Allanblackia stuhlmannii*, *Isobrerlinia scheffleri* evergreen rain-forest. Growing with *Impatiens* on rocks at the base of the Kwamukuyu Falls. Derema, E. Usambaras, alt. 610 m., 18 Apr. 1950, *Verdcourt* 151 :—herb with petals pale lilac, style violet, two long blue stamens, a staminode with two yellow thecae from a common filament, two longer yellow-anthered stamens with separated thecae, and one long yellow-anthered stamen.

This species, hitherto known only by the type-specimen collected many years ago in Somaliland, is now shown to extend to north-eastern Tanganyika Territory and southern Kenya. In this area it occurs in a wide variety of habitat, from rain-forest to *Acacia* Desert Grass country, but all the specimens so far collected have been from altitudes between 610 and 915 m. It is decidedly variable in size and width of leaves, and to some extent in hairiness, due I imagine to external conditions. The inflorescence and flowers are, however, constant except to some extent in size. The capsules of *Greenway* 1668 and *Verdcourt* 151 are often shorter and fewer-seeded than in the other specimens, but I see no other reason for separating them.

In view of the large amount of additional material of *A. rendlei*, and of its inadequate original description, for which no flowers were available, it seems worth while describing it again and fully.

Aneilema beniniense (*P. Beauv.*) *Kunth*, Enum. Pl. **4**, 73 (1843) ; C. B. Clarke in *Thiselton-Dyer*, Fl. Trop. Afr. **8**, 68 (1901).

Commelina beniniensis *P. Beauv.*, Fl. d'Oware et Benin, **2**, 49, t. 87 (1816).

Aneilema beniniense (*P. Beauv.*) *Kunth* var. *oxycarpum* ["oxycarpa"] *Hua* in Bull. Mus. Nat. Hist. Nat. Paris, **1** : 121. 1895.

Aneilema mortehani *De Wild.* in Bull. Jard. Bot. Brux. **5**, 84 (1915).

The type of *A. mortehani* *De Wild.* (*Mortehan* 1017) and the cotype (*Michiels* 16) have been kindly sent on loan by the Jardin Botanique de

l'État at Brussels, and they represent a rather narrow-leaved form of the widespread *A. beniniense*, not in my opinion even worth separating varietally. I can find no significant difference in habit indumentum or flowers.

In response to a request to the Muséum National d'Histoire Naturelle at Paris for the loan of the type of var. *oxycarpum*, *Griffon du Bellay* 98 (Gaboon, 1864) was kindly sent. I agree with Clarke that this variety is not worth distinguishing from ordinary *A. beniniense*.

***Aneilema dispernum* Brenan, sp. nov.**

[*Aneilema beniniense* (non (P. Beauv.) Kunth, —C. B. Cl. in Thiselton-Dyer, Fl. Trop. Afr. **8**, 68. 1901, pro minore parte, quoad specim. Whyte 305, *Whyte s.n.*, *Buchanan* 1167 tantum].

Habitu et facie *A. beniniensi* (P. Beauv.) Kunth peraffinis, capsulis latoribus obovato-orbicularibus latis vel latoribus quam longis, seminibus pro loculo unicis conferte rugoso-tuberculatis differt.

Herba adscendens usque ad 1 m. alta ; radices nondum visae. *Caules* parum ramosi, subsimplices, glabri sed inflorescentiam versus minute puberuli vel nonnunquam pubescentes, siccitate sulcati, 1–3 mm. diametro. *Folia* ovata usque ovato-oblonga, 5–12 cm. longa, 1.5–4 cm. longa, 1.5–4 cm. lata, suprema minora, pilis longiusculis appressis crebris cum aliis brevissimis perminimis (sub lente ~ 20 cernendis) satis dense commixtis utrinque pubescentes, nonnunquam pilis longioribus utrinque deficientibus hinc subglabra, apicem acutissimum versus sensim acuminata vel subacuminata, margine minutissime denticulata vel nonnunquam ciliolata, basi cuneata et folia media et inferiora in "petiolum" 0.5–2.5 cm. longum angustata ; vagina firma, laxa, clausa, saepius ut videtur pallide viridis, 5–20 mm. longa, 3–5 mm. diametro, extra glabra vel puberula vel prope margines connatos pilosula, ore inconspicue ciliata pilis saepe ferrugineis. *Inflorescentiae* terminales, densae, ovoideae vel ovoideo-pyramidales, 2–5.5 cm. longae, 2–4 cm. latae ; rhachis puberulus ; ramuli laterales 0.5–2 cm. longi, basi bractea axi inserta ovato-triangulari vel ovata 3–4 mm. longa basi 1.5–2.5 mm. lata scariosa apice obtusa parum incrassata, inferne puberuli, superne glabri bracteolis 2–5 oblique vaginato-amplexicaulibus 1.5–2.5 mm. longis obtusis inferne albo-viridibus vel scariosis apice siccitate conspicue incrassato-nigrescentibus. *Flores* secundi, albidi, albido-caerulei vel pallidissime rosei ; pedicelli glabri, 1.5–4 mm. longi, basi articulati. *Sepala* 3, glabra, late elliptica, 3–3.5 mm. longa, 2.5 mm. lata, prope apicem rotundato-subcucullatum incrassata. *Petala* 3, duo postica neque forma neque magnitudine e floribus exsiccatis enucleate describenda, sed quam antica majora, minimum 4 mm. longa, basi unguiculo circiter 2 mm. longo praedita ; unum anticum ellipticum, 3.5 mm. longum, 2.5 mm. latum, apice rotundatum, basi angustatum sed vix unguiculatum. *Stamina fertilia antica* : duo lateralia filamentis 6 mm. longis, 2 mm. apicalibus puberulis pilis circiter 0.1 mm. longis inferne glabris, antheris ellipsoideis 1.5 mm. longis 1 mm. latis ; unum centrale filamentum glabro circiter 3 mm. longo, anthera lutea circiter 1 mm. longa, curvata. *Staminodia postica* : duo lateralia filamentis glabris 3 mm. longis apice bifidis ramis 0.3 mm. longis utroque ramo in corpusculum luteum obovato-orbiculare circiter 0.5 mm. longum et latum desinente ; unum centrale

filamento glabro 2.5 mm. longa apice bifido ibi bicorpusculare. *Ovarium* glabrum, stylo glabro 6 mm. longo. *Capsula* bivalvata, pallide brunnea, nitida, glabra, late obovato-orbicularis vel latior quam longa, 4.5–5 mm. longa, 4.5–6 mm. lata, apice rotundato-truncata vel leviter emarginata medio brevissime (0.2 mm.) apiculata, basi angustata sed haud vel vix stipitata. *Semina* 2 pro capsula, ellipsoidea vel subglobosa, 2.2–2.8 mm. longa, 1.8–2.2 mm. lata, griseo-brunnea vel (*Migeod* 31) grisea, conferte rugoso-tuberculata.

BRITISH CAMEROONS. Victoria Division. Above Buea, alt. 1370 m., 4 Nov. 1927, *F. W. H. Migeod* 31 :—in forest ; herb ; flowers irregular with two large white petals.

TANGANYIKA TERRITORY. Eastern Province, Morogoro District, Ulugurus, Morningside, alt. 1370 m., 5 Dec. 1934, *E. M. Bruce* 262 :—marsh in forest, occasional ; small, dull blue flowers : vernacular name “Kongwa”. Southern Highlands Province, Rungwe District. Rungwe Forest, alt. 1700 m., 16 Sept. 1932, *Geilinger* 2376 :—to 50 cm. high ; flowers whitish-blue. Ngozi Forest, 26 Sept. 1932, *Geilinger* 2688 :—50 cm. high ; flowers bluish-white.

NYASALAND. North Nyasa District. Masuku Plateau, alt. 1980–2130 m., July 1896, *Whyte* 305. Zomba District. Mount Malosa, alt. 1220–1830 m., Nov.–Dec. 1896, *Whyte s.n.* Cholo District. Cholo Mountain, alt. 1200 m., Sept. 23, 1946, *Brass* 17763 (typus in Herb. Kew.) :—gregarious in rain-forest openings ; about 1 m. high ; habit ascending ; flowers very pale pink. Without precise locality, 1891, *Buchanan* 1167.

A. dispersum is very easily distinguished from *A. beniniense*, with which it was confused by C. B. Clarke, by the characteristic shape of its broad two-seeded capsules. Those of *A. beniniense* are oblong or oblong-ellipsoid, $1\frac{1}{2}$ –2 times as long as wide, and with 4–6 seeds.

There is a tendency, but no more than this, for *A. dispersum* to be hairier, particularly on the sheaths and leaves, than *A. beniniense*. This distinction can be broken down on both sides, for *Migeod* 31 (*A. dispersum*) is glabrescent, and forms of *A. beniniense* occur in West Africa with leaves \pm hairy particularly beneath, though these forms are rare (*Thomas* 2856, Sierra Leone, *Rowland s.n.*, *Brenan & Jones* 8734, Nigeria). *J. F. Baldwin Jr.* 13279 from Mont Koiré in French Guinea is very remarkable in having the vegetative parts densely pilose, although the inflorescence—only in flower—is typical of *A. beniniense*.

The distribution of *A. dispersum*, with its isolated station in the Cameroons, is interesting, but fits in with that of other principally east African montane species. In the east the areas of *A. beniniense* and *A. dispersum* apparently do not overlap ; *A. beniniense* is unknown in Nyasaland, and in Tanganyika has been collected only in Bukoba District (*Gillman* 104, 461), while *A. dispersum* has been collected four times in Nyasaland, and in Tanganyika occurs in the Uluguru and Rungwe Mountains.

Aneilema umbrosum (*Vahl*) *Kunth*, Enum. **4**, 71 (1843).

Commelina umbrosa *Vahl*, Enum. **2**, 179 (1806).

var. **umbrosum**

Commelina umbrosa Vahl, *l.c.*, sensu stricto.

Aneilema ovato-oblongum P. Beauv. var. *nigritanum* ["nigritana"] C. B. Cl. in DC., Monogr. Phan. **3**, 227 (1881); et in Thiselton-Dyer, Fl. Trop. Afr. **8**, 69 (1901).

Aneilema nigritanum (C. B. Cl.) Hutch. in Hutch. et Dalz., Fl. W. Trop. Afr. **2**, 312 (1936).

GOLD COAST. Eastern Province, Akwapim District. In secondary forest, Akwapim, 1927, *F. R. Irvine* 458A. District? "In umbrosis Assjamae", *Isert s.n.* (typus *Commelinae umbrosae* in Herb. Mus. Bot. Haun.).

DAHOMY. By the lagoon, Porto Novo, Oct. 1886, *F. Newton* 14.

NIGERIA. Calabar Province, Calabar Division. Oban, 1911. *P. A. Talbot* 755. Ilorin Province, Ilorin Division. Jebba, *Barter s.n.* (typus var. *nigritanae* in Herb. Kew.).

FERNANDO PO. "Fernando Po and vicinity", *Milne s.n.* Farm of Señor Marcelino Puente, near Musola, alt. c. 1000 m., 21 Jan. 1947, *Emilio Guinea* 1811.

FRENCH CAMEROONS. Joko, 25 Sept. 1914, *G. Tessmann* 2771.

GABOON. "Gaboon", 1817, *Tedlie in Bowdich's Mission to Ashantee s.n.* (Herb. Mus. Brit.). Munda region, Sibange Farm, 3 Dec. 1881, *H. Soyaux* 336 :—flowers white. Loango, Chinchoxo, on the Ton de Cache, 21 Nov. 1874, *H. Soyaux* 169 (Herb. Kew. et Herb. Haun.).

PORTUGUESE CONGO. Molemba near Landana, comm. *R. C. Phillips*.

BELGIAN CONGO. District du Bas-Congo. Stanley Pool, June, 1899, *R. Schlechter* 12530. District forestier central. Eala region, 17 Sept. 1925, *Robyns* 626. Eala, May 1930, *J. Lebrun* 229 (Herb. Haun.). Eala, 16 July 1936, *Couteaux* 14. Ingende on the Momboyo, 1935, *J. Louis* 71. District? Kimbambale, June 1914, *Vanderyst* 4331. Obangi River, 5 June 1889, *A. Feddersen jun. s.n.* (Herb. Haun.).

var. **ovato-oblongum** (*P. Beauv.*) *Brenan*, stat. nov.

Aneilema ovato-oblongum P. Beauv., Fl. d'Oware et Benin, **2**, 72 (1818) and t. 104 (1819?), sensu stricto; C. B. Cl. in DC., Monogr. Phan. **3**, 226 (1881), excl. var. β ; et in Thiselton-Dyer, Fl. Trop. Afr. **8**, 69 (1901), excl. var. β .

Commelina ovato-oblonga (P. Beauv.) Roem. et Schult., Syst. Veg., Mant. **1**, Addit. 1, 376 (1822).

[*Aneilema umbrosum* (non (Vahl) Kunth)—Hutch. et Dalz., Fl. W. Trop. Afr. **2**, 312 (1936)].

SIERRA LEONE. Northern Province, ?Koniandugu District. In dense forest by town, Berria, 30 Mar. 1892, *G. F. Scott Elliot* 5424. Northern Province, Tonkolli District. Bumbuna, alt. 200 m., 20 Oct. 1914, *N. W. Thomas* 3714. Northern Province, Bombali District. Mayaso, alt. 105 m., 6 Aug. 1914, *N. W. Thomas* 1420 :—vernacular name (T.) "Efantr". Yonibana, 30 Oct. 1914, *N. W. Thomas* 4250. Makump, 22 Aug. 1928, *F. C. Deighton* 1204 :—epiphytic on oil-palm; straggling, with white flowers. Mamunta, 7 Nov. 1948, *F. C. Deighton* 4931; in high forest; white flowers. Northern Province, Port Loko District.

Rokupr, 13 Sept. 1947, *H. D. Jordan* 95 :—epiphytic on an oil-palm. Southern Province, Pujehun District. Nomo chiefdom, Lowoma, 29 Oct. 1931, *J. D. Fisher* 55 :—herbaceous creeper on rock in forest shade with small white flowers.

LIBERIA. Open places, Cape Palmas, 18 July, 1841 [*Ansell?*] *s.n.* Same locality, 1842, *Ansell s.n.* Firestone Plantation No. 3, Du River, 13 Aug. 1926, *D. H. Linder* 325 :—abundant in clearings ; plants ascending, rooting at lower nodes ; flowers white with two conspicuous petals. Peáhtah, 15 Oct. 1926, *D. H. Linder* 1079 ; in original forest, overhanging river ; epiphyte ; flowers greenish. Central Province, Gbarnga District. Near St. John River, 31 Aug. 1949, *J. T. Baldwin jr.* 13222.

GOLD COAST. Without precise locality, *Burton & Cameron s.n.*

NIGERIA. Oyo Province, Ibadan Division. Side of waterworks near Ibadan, 19 Apr. 1950, *R. D. Meikle* 1472 :—on damp flat amongst grasses etc. by edge of reservoir ; straggling herb with bright green purple-stained stems ; leaves dull green above with hyaline bristles, grey-green beneath ; inflorescence-branches pale green ; upper sepal dark purplish, lower pale green tinged purple ; petals pale lilac ; anthers golden ; ovary shining silvery-green. Kabba Province, ? Lokoja Division. Lokoja, Mount Patti, 5 Nov. 1908, *J. M. Dalziel* 255. Lagos Colony. Lagos, Ikoyi Plains, 28 May 1917, *J. M. Dalziel* 1289 :—flowers small, white. Benin Province, Benin Division. In grassland near Benin City, *Palisot de Beauvois s.n.* (typus *Aneilemae ovato-oblongi* in Herb. Cons. Jard. Bot. Geneva).

BRITISH CAMEROONS. Kumba Division. Ilon Kumba, 9 Mar. 1936, *J. Smith Cam/87/36* (Herb. Ibadan).

FERNANDO PO. Clarence Peak, *Vogel* 143 :—flowers whitish. Musola, 10 Jan, 1947, *Emilio Guinea* 1172.

FRENCH CAMEROONS? Ngoka, Oct. 1899, *R. Schlechter* 12783.

UGANDA. Western Province, Toro District. Bwamba, Buyayu-Sempayo Road, Oct. 1929, *L. C. C. Liebenberg* 927 :—in forest ; creeping, about 20 cm. high, no flowers seen. Buganda Province, Mengo District. Forests, Entebbe, *J. Mahon s.n.* Kajansi Forest, Entebbe Road, alt. 1180–1200 m., May 1937, *P. Chandler* 1640 :—in forest, original vegetation cleared and much new secondary growth starting ; growing in a somewhat clumped way, clumps about 30–38 cm. in diameter ; height 22–25 cm. ; flowers white. Kajansi Forest, mile 10, alt. 1170–1180 m., Feb. 1938, *P. Chandler* 2172 :—in forest by the Entebbe Road with small stream near-by ; height up to about 30 cm. ; flowers whitish.

Short contrasting diagnoses of the two varieties recognised here should enable them to be identified normally without any difficulty :—

var. *umbrosum* ; vaginae extra pilis brevissimis crispis albidis puberulae, necnon pilis longis plerumque ferrugineis nunc densis nunc sparsissimis denique praesertim prope basim vaginae immixtis ; folia saepius ovato-lanceolata vel nonnunquam ovata ; axis paniculae saepe magis evolutus, usque ad circiter 9 cm. longus, subrectus.

var. *ovato-oblongum* ; vaginae extra pilis brevissimis puberulae, pilis longis tantum in margines ore vaginae impositis alibid omnino absentibus ;

folia ovato-lanceolata vel saepe late et breviter ovata ; axis paniculae saepe minus evolutus, usque ad circiter 4 cm. longus, saepe flexuosus.

Aneilema umbrosum (Vahl) Kunth and *A. ovato-oblongum* P. Beauv. have hitherto been generally treated as strictly synonymous, although the later name, *A. ovato-oblongum*, was the one most often used, doubtless following C. B. Clarke's revisions. In 1881 Clarke separated a specimen collected by Barter on the Niger as *A. ovato-oblongum* var. *nigritanum*, although the characters that he used to separate his variety are unreliable, and he completely missed the crucial difference in indumentum on the leaf-sheaths, which, however, did not escape Hutchinson's examination for the Flora of West Tropical Africa. There it was raised to specific rank under the name *A. nigritanum*. But Vahl had described the sheaths of his *Commelina umbrosa* as "vagina unguicularis basi pilis rufis barbata", i.e. as having the very character that was used in the Flora of West Tropical Africa to separate *A. nigritanum* from *A. umbrosum*. Clearly, it might be assumed that *A. nigritanum* and *A. umbrosum* were synonymous, and this is confirmed by Isert's original type-specimen of *Commelina umbrosa*, courteously sent on loan from the Museum Botanicum Hauniense. If *A. nigritanum* is maintained as a species, the name *A. umbrosum* must be used for it ; and what was called *A. umbrosum* in the Flora of West Tropical Africa would take the name *A. ovato-oblongum* P. Beauv. By the kindness of the Director of the Conservatoire et Jardin Botanique de Genève I have been able to examine Beauvois' type and its identity is without doubt.

The only reliable character separating var. *umbrosum*, as I have defined it, from var. *ovato-oblongum* is the presence of long normally rusty hairs on the surface of the leaf-sheaths, and while these are sometimes dense, notably in some Belgian Congo specimens, they are at other times very sparse indeed, just a few at the very base of the sheath. The differences in leaf and inflorescence, especially the former, are no more than tendencies, and far from constant ; and I do not consider that the two plants should be made distinct species, at any rate from the present evidence.

Chevalier 19494 from the Ivory Coast, cited under *A. nigritanum* in the Flora of West Tropical Africa, I have not seen and have therefore omitted it from the citations. *Migeod* 474 from Bamenda in the British Cameroons is also mentioned, but this is so different from the rest of the material of var. *umbrosum*, with its very robust habit and leaves asperous above, that it may well be something different, although more material is wanted for any certainty.

None of the New World material that I have examined is typical *A. umbrosum*, and although the inflorescence-axes tend to be straighter than in African var. *ovato-oblongum*, it is probably best placed under that variety.

***Aneilema lanceolatum* Benth.** in Hook., Fl. Nigrit. 546 (1949).

var. ***lanceolatum*.**

Aneilema lanceolatum Benth., l.c., sens. strict. ; C. B. Cl. in DC., Monogr. Phan. 3, 227 (1881) ; C. B. Cl. in Thiselton-Dyer, Fl. Trop. Afr. 8, 72 (1901), excl. syn. *A. rhodospermum* K. Schum. ined., et spec. *Zenker* 1110, excl. etiam var. *evolutius*.

- Lamprodithyros gracilis* Kotschy et Peyr., Pl. Tinn. 47, t. 23 fig. A. (1867).
Aneilema gracile (Kotschy et Peyr.) C. B. Cl. in DC., Monogr. Phan. 3, 228 (1881), C. B. Cl. in Thiselton-Dyer, Fl. Trop. Afr. 8, 73 (1901).
Aneilema schweinfurthii C. B. Cl. in DC., Monogr. Phan. 3, 227 (1881) ; C. B. Cl. in Thiselton-Dyer, Fl. Trop. Afr. 8, 71 (1901).
Aneilema subnudum A. Chev. in Bull. Soc. Bot. Fr. 58, Mém. 8, 216 (1912) ; Hutch. et Dalz., Fl. W. Trop. Afr. 2, 314 (1936)

var. **evolutius** ["evolutior"] C. B. Cl. in DC., Monogr. Phan. 3, 227 1881 ; C. B. Cl. in Thiselton-Dyer, Fl. Trop. Afr. 8, 72 1901).

Aneilema soudanicum C. B. Cl. in Thiselton-Dyer, Fl. Trop. Afr. 8, 72 (1901).

C. B. Clarke separated *A. lanceolatum* from *A. soudanicum* and *A. schweinfurthii* by its fibrous roots contrasting with the thickened roots of the other two. The evidence for this proves to be a few small fibres emerging from the base of a single stem of the type-collection of *A. lanceolatum* ; otherwise, the types of *A. lanceolatum* and var. *evolutius* give no clue about their roots. I do not consider that the fibres just mentioned are in the least convincing as evidence, since similar fibres may be seen (e.g. in Thomas D. 158, Gold Coast, Dalziel 807, Nigeria) in this position accompanying the longer thickened roots, which, I have no doubt, Vogel when he picked the type of *A. lanceolatum* left behind firmly embedded in the ground. In fact these thickened roots seem typical both of *A. lanceolatum* and *A. schweinfurthii*.

The size and development of the foliage in *A. lanceolatum* is exceedingly variable, but there seems nothing constant in this, as with many savannah herbs, and it is no doubt dependent on the season and on how well (or badly) the flowering-time and the rains are synchronised ; burning is also no doubt important.

Aneilema subnudum was separated from *A. lanceolatum* merely by the shorter narrower leaves and inflorescences. I find every intermediate in leaf-size, with the short narrow leaves sometimes coupled with the broader inflorescences of *A. lanceolatum*. A gathering made by my colleague, Mr. R. D. Meikle, in Nigeria (No. 1173) shows that the inflorescence varies greatly in size and width. For these reasons I feel sure that *A. subnudum* is a bad species.

I cannot separate *A. soudanicum* from *lanceolatum* var. *evolutius* which is no more than a distinct hairiness-variant of *A. lanceolatum*, characterised by the stem-internodes being more or less densely pilose with long spreading hairs half as long or more as the diameter of the stem ; while typical *A. lanceolatum* has the internodes merely minutely puberulous.

The distribution of *A. lanceolatum* now extends from the Ivory Coast, the Gold Coast and Nigeria, Cameroons and Ubangi-Shari (I have seen a single probably correct specimen from here) to the Anglo-Egyptian Sudan, Uganda and Kenya. The var. *evolutius* is known from the Cameroons, Nigeria, the Gold Coast and the Anglo-Egyptian Sudan.

***Aneilema silvaticum* Brenan, nom. nov.**

[*Aneilema lanceolatum* (non Benth.)—C. B. Cl. in Thiselton-Dyer, Fl. Trop. Afr. 8, 72 (1901) pro parte, quoad syn. *A. rhodospermum* K. Schum. ined. et spec. Zenker 1110 tantum].

Aneilema affine ["*affinis*"] De Wild. in Bull. Jard. Bot. Brux. **5**, 83 (1915), non *A. affinis* R. Br., Prod. Fl. Nov. Holl. 271 (1810).

var. **silvaticum** (*A. affine* De Wild., sens. strict.) ; folia supra glabra vel pilis longiusculis perpaucis induta.

NIGERIA. Benin Province, Benin Division. Sapoba, 1931, *J. D. Kennedy* 1758 A. [? Sapoba], *J. D. Kennedy* 2674. Between Agbadi and Sapoba, 13 Nov. 1949, *R. D. Meikle* 637 :—on margin of forest, in shade ; a slender straggling herb ; leaves shining mid-green above, pale dull green tinged purple beneath ; stems bright green ; flowers white or very pale blue.

BELGIAN CONGO. District Forestier Central. In forest, Mobwasa, June 1913, *H. Lemaire* 379 (typus speciei in Herb. Brussels). Near Mobwasa, July 1913, *F. Reygaert* 730 (Herb. Brussels) :—forest herb.

var. **pilosum** *Brenan*, var. nov. (*A. rhodospermum* K. Schum., ined.) ; folia supra (*Seret* 69) vel utrinque (*Zenker* 1110) pilis longiusculis plus minusve dense induta.

FRENCH CAMEROONS. Forest region, Bipinde, 1896, *Zenker* 1110 (typus varietatis in Herb. Kew.).

BELGIAN CONGO. District Forestier Central. Road from Buta to Bima, 15 Oct. 1905, *F. Seret* 69 (Herb. Brussels) :—creeping plant ; violet flowers.

The two varieties made above may prove merely extremes of indumentum and not worth separating.

De Wildeman, in his original description of *A. affine*, made the stamens filaments glabrous, and 2-3 fertile anthers. The filaments of two lateral anticus fertile stamens are shortly barbate, however, and this is shown by all the numbers cited by De Wildeman. I have seen constantly 3 fertile anthers, and suspect that De Wildeman must have looked at an old flower with one of the anthers—they are very caducous—fallen.

De Wildeman compared his new species to a miniature *A. beniniense* (P. Beauv.) Kunth, aptly in my opinion. *A. silvaticum* differs in the more slender habit, smaller leaves and inflorescences, smaller flowers (notably sepals), the shortly beaked capsule, not rounded at apex as in *A. beniniense*, and—an useful and apparently constant vegetative character—the leaves being ciliate with small but distinct hairs, which in *A. beniniense* are represented by very minute close-set cartilaginous teeth. *A. beniniense* shares with *A. silvaticum* the shortly bearded filaments of the two lateral anticus fertile stamens ; as do *A. umbrosum* (Vahl) Kunth, which has very different lax inflorescences and capsules, and *A. lanceolatum* Benth., which has longer narrower leaves not contracted into a "petiole" at base, is erect and has thickened roots, and is a plant of grassland and savannah, not forest. I disagree with C. B. Clarke's view that *A. rhodospermum* K. Schum. ined., based on *Zenker* 1110, is synonymous with *A. lanceolatum*.

A. silvaticum has a certain resemblance to two species from eastern Africa—*A. dregeanum* Kunth and *A. rendlei* C. B. Cl. From the first it differs by the smaller inflorescences with glabrous or subglabrous lateral

branches and pedicels, glabrous calyx with sepals only 1.5–2 mm. long (3–4 mm. in *A. dregeanum*), and the shortly (not long-) barbate anticous stamen-filaments; from *A. rendlei* it differs in the smaller inflorescences and sepals, the puberulous not glabrous inflorescence-axis, and the shortly barbate (not glabrous) anticous stamen-filaments.

CYANOTIS D. Don.

Cyanotis longifolia Benth. in Hook., Fl. Nigrit. 543 (1849); C. B. Cl. in DC., Monogr. Phan. 3, 259 (1881); et in Thiselton-Dyer, Fl. Trop. Afr. 8, 81 (1901).

Cyanotis djurensis C. B. Cl. in DC., Monogr. Phan. 3; 256. 1881; et in Thiselton-Dyer, Fl. Trop. Afr. 8, 82 (1901).

In its typical form *C. longifolia* is easily recognised by being erect, attaining a height of one metre, though often very much lower; by lacking a bulb but having instead numerous tuberously thickened fibres radiating from the stock; by the base of the stem, just above its junction with the rootstock, being more or less densely clothed with long upwards-pointing silky hairs; by the normally elongate leaves; by the sessile capitula; and by the sepals being densely barbate particularly in their upper part. This latter character is particularly obvious in fruit when the bracteoles in the capitula become more open.

C. longifolia has been very much confused, particularly with the plant called *Cyanotis hirsuta* Fisch. et Mey. in the Flora of Tropical Africa. *C. hirsuta* is a nomen subnudum, and I doubt whether it can be separated from the Asiatic *C. barbata* D. Don; it has a bulb and lacks the tuberous root fibres. In West Africa *C. longifolia* has been muddled up with *C. lanata* Benth., and several of the specimens cited under the latter species by Hutchinson and Dalziel, Fl. W. Trop. Afr. 2, 317 (1936), are in fact *C. longifolia*. *C. lanata* is separated from *C. longifolia* by normally being annual, the roots being only fibrous; by the usually much branched prostrate or diffuse habit; and by the short leaves and smaller capitula.

Barter 492, referred to by C. B. Clarke in Fl. Trop. Afr. 8, 84 (1901) under *C. dybowski* Hua, is certainly *C. longifolia* Benth.

I have seen the type of *C. dybowski* Hua (*Dybowski* 760, from the French Congo, through the courtesy of the Muséum National d'Histoire Naturelle at Paris. The whole plant is clothed with spreading hairs and it lacks the floccose indumentum so often seen in *C. longifolia*, particularly round the capitula. I suspect that it will prove a variant of *C. longifolia*, but I do not feel sure.

C. longifolia has a very wide distribution indeed in Africa, and seems to be one of the commonest species in the genus. It occurs in the French Sudan (*Chevalier* 24773) French Guinea (*Collenette* 65, *Scaëtta* 3247), Sierra Leone (*Adames* 47, etc.), Ivory Coast (*Chevalier* 21712, 21806), Gold Coast (*Irvine* 1714) Nigeria (*Keay* FHI. 25972, *Dalziel* 257, 808), Ubangi-Shari (*Chevalier* 8652), French Cameroons (*Mildbraed* 9538, 9601), Gaboon (*Thollon s.n.*), Belgian Congo (*Lebrun* 9552, etc.), Anglo-Egyptian Sudan (*Schweinfurth* 1944, *Myers* 7334, etc.), Uganda (*Snowden* 222, *Dummer* 4514, *Hazel* 469, etc.) Kenya (*Dale* 3276, *Napier* 6819), Tanganyika Territory (*Haarer* 950, 2437, *Musk* 98, *Emson* 365, etc.), Nyasaland (*Whyte s.n.* from Zomba), Northern Rhodesia (*Kaessner* 2166, 2265, *Marks* 76, etc.),

Southern Rhodesia (*Hislop* 68, *Teague* 538, 620, *Eyles* 6880) and Angola (*Gossweiler* 2896, etc.).

C. longifolia is most variable in height and whether there are one or several capitula in the inflorescence, I suspect that this is due to the varying severity of the fires and the rigorous extremes of climate encountered in the savannahs of tropical Africa. In addition to the habit, the indumentum also varies much. C. B. Clarke in DC., *Monogr. Phan.* 3, 259 (1881), distinguished a var. *bakeriana* which in his later treatment in the *Flora of Tropical Africa* he regarded, rightly I believe, as merely part of the general range of variation within this species. The indumentum is normally more or less dense, conspicuous and cottony or pilose in appearance. Sometimes this is almost absent, the plant appearing subglabrous. I have seen such extremes from Sierra Leone (*Thomas* 1583, 1885, 3740, *Dawe* 558), Ubangi-Shari (*Chevalier* 8652) and Northern Rhodesia (*Milne-Redhead* 3937). I do not feel that it is at present justified to separate these plants varietally, as they are certainly bound to typical *C. longifolia* by numerous intermediates, and in addition the general pattern of variation in *C. longifolia* still requires working out. Even in the most glabrescent extremes the erect hairs near the stem-base and the dense apical tuft of shorter hairs on the sepals—both of them points I consider important in recognising this species—are still present.

FLOSCOPA Lour.

***Floscopa leiothyrsa* Brenan, sp. nov.**; affinis *F. rivularioidi* Th. Fr., bracteis multo angustioribus, panícula effusiore glaberrima facillime distinguenda.

Herba ut videtur erecta, 20–33 cm. alta, radicibus verisimiliter fibrosis. *Caules* basi geniculati, glabri vel fere glabri, e basi sparse ramosi, aliter praeter inflorescentias simplices. *Folia* sparsa, anguste lanceolata, 5–8 cm. longa, basi 6–8 mm. lata, glabra, apicem attenuato-acutum versus sensim angustata, aliquid involuta, marginibus ut videtur undulatis, basi haudquaquam petiolata et in vaginam clausam glabram circiter 1–1.5 cm. longam 3–5 mm. diametro transeuntia; folia superiora et suprema, i.e. bracteae, sensim decrescentia, suprema circiter 0.4–1.5 cm. longa et basi 1–1.5 mm. lata. *Inflorescentiae* terminales, laxae, glaberrimae, quibus aliae laterales reductae ex axillis superioribus exorientes ab inflorescentiis terminalibus aegre secernendis saepe additae sunt, omnino circiter 8–15 cm. longae, 3–4.5 cm. latae; ramuli laterales inflorescentiae circiter 2–4 cm. longi, simplices vel ramosi 1–3 gerentes; ramuli ultimi curvati, satis dense floriferi, inferne nudi praeter bracteolas 2–3 sparsas steriles; bracteolae brunneo-scariosae, suborbiculares, 1–1.5 mm. diametro, sine vaginis. *Flores* secundi, scorpioideo-racemosim dispositi, pallide violacei; pedicelli 1–2 mm. longi, glaberrimi, basi articulati. *Sepala* 3, extra convexa, elliptica, apice obtusa, 3.5–4 mm. longa, anticum paulo latius (2.3–2.5 mm.) quam duo postica (1.4–1.5 mm.). *Petala* 3, unum posticum oblongo-lineare, 3.5 mm. longum, 0.4–0.5 mm. latum, apice obtusum, duo antica obovato-elliptica, circiter 3 mm. longa, 2.2 mm. lata, apice rotundata. *Stamina* 6, tria thecis subparallelis antheris suborbicularibus circiter 0.6 mm. diametro filamentis circiter 3 mm. longis, tria thecis divaricatis antheris circiter 1 mm. latis filamentis circiter 2 mm. longis. *Ovarium* compressum, ellipticum,

glabrum, 1 mm. longum, 0.75 mm. latum, basi stipite 0.5 mm. longo, apice stylo spirali 3 mm. longo; loculi uniovulati. *Capsula* pallide olivacea, nitida, subquadrata, inflata, circiter 2.5 mm. longa, 2 mm. lata, basi brevissime stipitata, apice subtruncata. *Semina* nondum matura.

TANGANYIKA TERRITORY. Central Province, Dodoma District. Chaya Lake, local on saturated soils of receding lake shore in shade of *Gardenia* trees, alt. 1250 m., 12 July 1932, *B. D. Burtt* 3802 :—flowers small, pale violet-coloured, pretty.

The glabrous panicle is the outstanding feature of this species, and in this it is apparently unique among the African *Floscopae*. In general appearance it is nearest to *F. rivularioides*, Th. Fr., but differs in the much larger panicle and the much narrower bracts, i.e. the foliar organs subtending the lateral branches of the inflorescence.

Floscopa polypleura *Brenan*, sp. nov.; affinis *F. rivulari* (A. Rich.) C. B. Cl., facie simili sed capsula longius stipitata, stipite longitudinem dimidiam capsulae adaequant, capsula apice truncata vel subtruncata haud ut in *F. rivulari* distincte apiculato-acuminata, seminibus costis radialibus tenuioribus numerosioribus (20–23, nec 14–16) differt.

Herba erecta vel suberecta, 25–50 cm. alta, radicibus fibrosis. *Caules* e basi singuli vel pauci, aliter praeter inflorescentias simplices, inferne glabri vel fere glabri, apicem versus pilis glandulosis laxe pubescentes. *Folia* sparsa, lanceolata vel lineari-lanceolata, usque ad 15 cm. longa, basi 10–12 mm. lata, marginibus praesertim basim versus breviter ciliatis exceptis glabra, apicem attenuato-acutum versus sensim angustata, basi haudquaquam petiolata et in vaginam extra glabram per 3–17 mm. clausam circiter 3–6 mm. diametro transeuntia; folia superiora et suprema, i.e. bracteae, sensim decrescentia, suprema circiter 1.3–2.5 cm. longa et 3–8 mm. lata. *Inflorescentiae* terminales, satis confertae, pilis glandulosis siccitate flexuosis satis dense pubescentes, 2–9 cm. longae, 1–6 cm. latae; aliae reductae ex axillis inferioribus nonnunquam ortae; ramuli laterales inflorescentiae 1–5 cm. longi, simplices vel ramos 1–4 gerentes; ramuli ultimi recti vel leviter curvati, saepius usque fere ad basim dense floriferi, nonnunquam breviter nudi; bracteolae scariosae, perminimae, ellipticae obovatae vel lanceolatae, 0.5–1 mm. longae, sine vaginis. *Flores* secundi, scorpioideo-racemosim dispositi, purpureo-lilacini; pedicelli 1–2.5 mm. longi, glanduloso-pubescentes, basi articulati. *Sepala* 3, extra convexa, elliptica, apice obtusa, 3–3.5 mm. longa, 1.5–2 mm. lata, anticum paulo latius quam duo postica, omnia extra glanduloso-pubescentia. *Petala* 3; unum posticum oblongo-lineare, circiter 3 mm. longum, 0.5 mm. latum; duo antica obovato-elliptica, circiter 3 mm. longa, 2 mm. lata. *Stamina* 6, tria thecis subparallelis antheris suborbicularibus circiter 0.6 mm. longis 0.7–0.8 mm. latis filamentis circiter 3 mm. longis, tria thecis sejunctis connectivo in corpusculum rotundato-reniforme infra thecas dilatato, antheris circiter 0.6 mm. longis et latis filamentis circiter 2.5 mm. longis. *Ovarium* compressum, suborbiculare, glabrum, 0.6–0.7 mm. longum, 0.75 mm. latum, basi stipite 0.5 mm. longo, apice stylo glabro curvato circiter 3.5 mm. longo; loculi uniovulati. *Capsula* pallide grisea, nitida, transverse breviter oblongo-ellipsoidea, inflata,

1.3–1.6 mm. longa, 2–2.3 mm. lata, apice truncata vel subtruncata, basi stipite 0.8–1 mm. longo. *Semina* ellipsoidea, grisea, circiter 1 mm. longa, 0.75 mm. lata, costis radialibus tenuibus 20–23 notata.

GOLD COAST. Dagomba District. Yendi, Nov. 1935, *G. K. Akpabla* 476 :—in stream ; flowers small.

NORTHERN RHODESIA. Chienji District. Nkonte plain, near Mkupa, alt. 1040 m., 12 June 1950, *A. A. Bullock* 2939 (typus in Herb. Kew.) :—common in both wet and dry parts of the plain ; suberect herb ; flowers lilac-purple. Abercorn District. Fwambo, near Abercorn, alt. 1600 m., 1896, *W. H. Nutt s.n.* Broken Hill District. Broken Hill, May 1909, *Rev. F. A. Rogers* 8033.

The occurrence of this plant in the Gold Coast as well as Rhodesia is remarkable, but suggests that it has been overlooked in between. The new species is near *F. rivularis* but differs in the non-apiculate capsule on a longer stipe, and in the seeds with more numerous radial ridges, the reason for the specific name chosen.

Hardy Trees and Shrubs.—The second edition of Krüssmann's book* on the hardy broad leaved trees and shrubs cultivated in Germany is in many ways excellent, but has a number of failings. It is arranged in dictionary style, which makes for easy reference if one merely wishes to check the name of a plant with which one is already familiar. This treatment is less useful for the enquiring novice trying to identify a plant new to him. Related genera are necessarily separated from one another. With few exceptions there are no keys, though a conspexus of the sections of larger genera is given. Even so, no further use is made of this additional information except in *Rhododendron*, where the series and subseries names are added in brackets after the specific names. With the alphabetical arrangement, it is still necessary to look through the whole of the 98 species described to be certain that all the species of a series have been considered. The key, based on vegetative features alone, provided for the willow species will leave many problems unsolved, for there are 93 species and hybrids very briefly described and only single leaves are illustrated on the three plates. The illustrations are one of the redeeming features of the book for they are generally clear and accurate and are drawn to scale. The leaf illustrated for the Cornish elm is not recognisable as belonging to that species, which is placed as a variety under *Ulmus carpinifolia*. The nomenclature, it is claimed, has been revised in accordance with the rules as revised at Stockholm. Nevertheless, a sprinkling of polynomials remains, as among the horticultural varieties of *Calluna vulgaris*. A system of starring has been adopted, similar to that employed in guides to hotels and garages, in order to indicate degrees of desirability of the plants for the garden lover. Another helpful feature for the horticulturist is the inclusion of lists of specific and varietal synonyms under the genera as well as a separate index of invalid names mentioned in the text.

R. MELVILLE.

*Gerd Krüssmann : Die Laubgehölze. Alphabetisches Verzeichnis nebst Beschreibung und Bewertung der in Deutschland winterharten Laubgehölze. Ed. 2. 1951. Paul Parey, Berlin.

NOTES ON ASIATIC GRASSES : V.

The Genus *Microstegium* in India and Burma.

N. L. BOR.

The genus *Microstegium* was established by Nees von Esenbeck in Lindley, *Nat. Syst.* ed. 2, 447 (1836), to accommodate a grass in Willdenow's herbarium which was stated to have come from Nepal. The generic name is made up of two Greek words, 'μικρός, small, and στεγή, a covering, a scale, the combination referring to the usually very minute lemma of the fertile floret. The specific name of the species was not published till nearly 20 years later when *M. willdenowianum* Nees was given a description by Steudel in his *Syn. Pl. Glum.* 411 (1855). In this work something more definite about the specimen upon which the genus and species were based, is given. Reference is made to Wallich's no. 8838, a grass which was collected in Nepal.

The same species was placed in another genus and given another name by Nees, for in Steudel l.c. 410, appears the name *Pollinia imberbis* Nees. This name was based on Wallich's sheet : *Bathratherum* 8832. This grass is the same species as that on sheet no. 8838, the only difference between them being that no. 8838 is unawned while no. 8832 is awned. A further complication is added by the introduction of the name *Pollinia*. This genus was first proposed by Sprengel in his *Pugillus* 2, 10 (1815). The species enumerated by him under his genus *Pollinia* are such a heterogeneous collection as to merit the term "farrago" which appears in the *Index Kewensis* after the citation of the genus.

Sprengel's genus, *Pollinia*, contained unrelated species which had been relegated to several genera already in existence, and its claim to recognition finally disappeared when the name *Chrysopogon* was conserved against it. The great Trinius in *Mem. Acad. Sc. Petersb.* ser. 6, 2, 304 (1832), had realised that *Pollinia* Spreng. was a badly conceived genus, but he actually made use of the name and altered the characteristics of the genus to accommodate four closely related species, none of which figured in the list of Sprengel's species. Trinius says "generis in Spreng. Pug. II et in L.S.V. ed. XVI minus apte compositi nomen memoriae celeberrimi Botanici Veronensis consecratum, mutato caractere servare, quam novum introducere malui".

While there can be no doubt that Trinius' intention to perpetuate the name of an eminent botanist was entirely praiseworthy, it is also clear that what he was proposing to do was likely to cause great confusion. The Rules of Nomenclature are absolutely clear on this question and the genus *Pollinia* Trin., being a later homonym has no status whatever in botanical nomenclature. The conception of the genus *Pollinia* Trin. was in the following years enlarged and expanded to take species which are now included in the genera *Eulalia* and *Pseudopogonatherum*. Since the name *Pollinia* is ruled out the next available name for the genus is that of Nees von Esenbeck, namely, *Microstegium* Nees.

Microstegium willdenowianum Nees the type specimen of the genus has had a somewhat chequered history in the last hundred years and has received no less than six specific under four generic names before being given its present-day name *M. vimineum* (Trin.) A. Camus, based on the earlier name *Andropogon vimineus* Trinius.

Former work on the genus.

All the species of India and Burma were formerly collected under the genus *Pollinia* Trin., which also included those species which are now to be found in the genera *Eulalia* and *Pseudopogonatherum*. The subgenus *Leptatherum* (Benth. et Hook.) Hack. of the genus *Pollinia* Trin. *sensu lato*, is that in which the modern species of *Microstegium* are to be found. Hackel in *D.C. Monogr. Phan.* **6**, 151, (1889) and Hook. f., *Flor. Brit. India*, **7**, 114–118 (1896) are the two authors who have done comprehensive work on the genus.

The first subdivision of the subgenus *Leptatherum* (Benth. et Hook.) Hack. was on the basis of stamen number. This excluded *M. nudum* (Trin.) A. Camus, since it has only two stamens. The next subdivision was on anther-size. This got rid of *M. vimineum* (Trin.) A. Camus, since the anthers in the latter are very small. The remaining species were again subdivided into those with and those without a lemma in the lower floret.

This criterion has been most unsatisfactory, since it is possible to find in the same panicle spikelets which possess a lower lemma and those in which it is absent. The result has been that two names have been given to the same species because in one group the lower lemma is usually present, while in the other it is more often absent, or has not been found.

Hackel in *DC. Monogr. Phan.* **6**, 170–182 (1889) enumerates the following species from India and Burma under *Pollinia* [subgen. *Leptatherum* (Benth. et Hook.) Hack.] which are certainly species of *Microstegium* Nees.

P. eucnemis Nees ap. Steud.

P. vagans Nees ap. Steud.

P. monantha Nees ap. Steud.

P. grata Hack.

P. ciliata Trin.

P. imberbis Nees ap. Steud.

P. nuda Trin.

Hook. f. added *Pollinia delicatula* and *P. stapfii* in *Flor. Brit. Ind.* **7**, 115, 117 (1896), bringing the number of species up to nine. *Ischaemum petiolare* (Trin.) Hack. was transferred to *Microstegium* by Bor in *Ind. For. Rec.* **1**, 3, Bot., 87 (1938). *Coelarthron brandisii* Hook. f. was transferred to *Microstegium* by Rhind in *Burm. Grasses*, 62 (1945), giving a total of eleven species.

In the present study the following species are recognised as good and valid species inhabiting the area under consideration :—

Microstegium eucnemis (Nees ex Steud.) Henr. [includes *M. brandisii* (Hook. f.) Rhind].

M. vagans (Nees ex Steud.) Henr. [includes *M. gratum* (Hack.) A. Camus].

M. ciliatum (Trin.) A. Camus [includes *M. monanthum* (Nees) A. Camus].

M. nudum (Trin.) A. Camus.

M. petiolare (Trin.) Bor.

M. delicatulum (Hook. f.) A. Camus.

M. vimineum (Trin.) A. Camus.

M. stapfii (Hook. f.) Henr.

The characters of the genus *Coelarthron* Hook. f., differ in no way from those of *Microstegium*, and it has been sunk in synonymy under the latter name.

The reasons for these reductions are given under the species concerned.

CHARACTERISTICS OF THE GENUS.

All of these grasses, whether annual or perennial, are decumbent and rooting at the base. Typically forest grasses, such as *M. petiolare* (Hack.) Bor and *M. ciliatum* (Trin.) A. Camus, scramble about over other vegetation, and the latter is gregarious and covers very large areas in places in which it is in partial shade, as for example, in a *sal* (*Shorea robusta* Gaertn.) forest. In such places it is of economic importance since it will not allow the *sal* seedling to develop. It does not dry up and burn like other grasses, and even if a fire can be induced to run through it, it does the grass little damage. *Eupatorium odoratum* Linn. can invade and oust this grass but only where the forest canopy has been thinned out. Thatch grass (*Imperata cylindrica* P. Beauv.) too, can make some headway against it if the canopy is opened and fires run through the undergrowth.

The main characteristics of the spikelet are the lower glume, which is more or less deeply channelled, and the upper lemma which in all species but one is very minute, being hardly more than the hyaline base of the stout geniculate awn. The one exception is *M. petiolare* (Trin.) Bor in which the upper lemma is almost as long as the spikelet and deeply cleft into two lobes, between which is the stout geniculate awn.

The lower floret is most peculiar. In the majority of the species the lower lemma is absent or is much subordinate to the palea, which, if both are present, is much larger and firmer in texture. The palea is not 2-keeled as is usual in that organ, but is convex with the convexity towards the axis of the spikelet. The usual rôles of these two organs seems to be reversed in the *Microstegium* spikelet in which the palea is the more important scale. Indeed, the palea is often the sole representative of the floral envelope of the lower floret, since the lemma is frequently absent or represented by only a very minute, hyaline scale. No reliance can be placed upon the presence or absence of the lemma, and it is, on occasion, both present and absent in the same panicle.

GENERIC DESCRIPTION.

***Microstegium* Nees ex Lindley.**

Ephebopogon Nees in Proc. Linn. Soc., **1**, 92 (1841).

Pollinia sect. *Leptatherum* Benth. in Benth. et Hook. f., Gen. Pl. **3**, 2, 1127 (1883).

Nemastachys Steud., Syn. Pl. Glum. 357 (1854).

Spikelets binate, one sessile, the other pedicelled on the articulate fragile rhachis of subdigitate, spikelike racemes, rarely the racemes arranged on a short central axis, or the racemes solitary, the pedicelled spikelets falling from the pedicel, the sessile deciduous together with the adjoining joint of the rhachis and the pedicel: joints and pedicels flattened or inflated, glabrous to densely ciliate on the margins. *Florets* typically 2; the lower more or less reduced, either lemma or palea or

both absent or present with a male, rarely a hermaphrodite flower ; the upper always hermaphrodite and lemma and palea present. *Glumes* usually equal in length, the lower dorsally flattened or slightly convex with a deep longitudinal channel or rarely without a channel, compressed, 2-keeled, ciliate on the keels above, 4-6-nerved, with the nerves anastomosing at the sides and the tip ; the upper boat-shaped, membranous to chartaceous, 3-nerved, apiculate, mucronate or shortly awned. *Lower lemma* absent, or when present, hyaline, ciliate on the margins ; *palea* absent or when present, membranous to chartaceous, concave on the surface next the glume, nerveless or faintly 2-nerved ; *stamens* when present, 3 ; *ovary* absent. *Upper lemma* rarely three quarters the length of the spikelet, cleft to the middle into two lanceolate lobes, most often small to minute, minutely 2-toothed or shortly 2-lobed at the top, awned ; *palea* most often small, subquadrate to lanceolate, ciliate ; *stamens* 3 or 2 ; *anthers* long or short ; *styles* 2, long ; *stigmas* plumose ; *lodicules* 2, cuneate, truncate ; *grain* terete ; *hilum* basal, punctiform.

Perennial or annual grasses, decumbent and rooting from the lower nodes, finally erect and often scrambling over other vegetation. *Leaf-blades* narrowly elliptic, acuminate at both ends, more or less petioled at the base, almost setaceous at the tip ; sheaths contracted at the top to the petiole-like base of the blade ; *ligule* short, membranous. *Inflorescence* of spike-like racemes often purplish in colour.

Key to the species of *Microstegium*.

Upper lemma well developed, split to the middle into two long, glabrous, triangular lobes 1. *M. petiolare*

Upper lemma small, very shortly 2-lobed :—

Anthers very small, 0.3-0.5 mm. long ; spikelets usually awnless ;
lower glume 4.5-6 mm. long with prominently anastomosing veins
2. *M. vimineum*

Anthers much larger :—

Racemes thickly covered and almost obscured by fulvous-brown hairs, supported at the base by a number of glabrous, imperfect spikelets ; pedicelled spikelets very small . . . 3. *M. stapfii*

Racemes and pedicelled spikelets not as above :—

Anthers 3 ; racemes not usually spreading at right angles :—

Joints of the racemes and pedicels inflated-clavate, hollow

4. *M. eucnemis*

Joints of the racemes linear or at most slightly dilated upwards :

Spikelets 3-4.5 mm. long ;

Anthers 2-2.5 mm. long ; spikelets 3.5-4 mm. long, purplish ; nodes glabrous or hairy ; lower glumes oblong or obovate-oblong 5. *M. vagans*

Anthers 1-1.8 mm. long ; spikelets 3-3.5 mm. long, pale ; nodes glabrous ; lower glume lanceolate to lanceolate-oblong 6. *M. ciliatum*

Spikelets 2-2.5 mm. long 7. *M. delicatulum*

Anthers 2 ; racemes 4.5-10 cm. long, not digitate, spaced at right angles on the rhachis 8. *M. nudum*

1. *Microstegium petiolare* (Trin.) Bor in Ind. For. Rec. **1**, 3 (Bot.) 87 (1938).

Spodiopogon petiolaris Trin. in Mem. Acad. Petersb. sér. 6, **2**, 301 (1832).

Andropogon petiolaris (Trin.) Steud. Syn. Pl. Glum. 398 (1854).

Pollinia lehmanni Arn. et Nees ex Nees in Nov. Act. Nat. Cur. **19**, Suppl. 1, 186 (1843).

Spodiopogon lehmanni Griseb. in Goetting. Nachr. 91 (1868).

Ischaemum petiolare (Trin.) Hack. in DC. Monogr. Phan. **6**, 238 (1889).

A perennial grass, scrambling, climbing. Culms 60–100 cm. or even more tall (up to 400 cm.) decumbent at the base, rooting at the lower nodes, finally erect, branching, stout, terete, smooth and glabrous, pubescent or glabrous below the panicle, pubescent on the nodes. Leaf-blades 5–30 cm. long, up to 2.5 cm. broad, elliptic, oblong or linear-lanceolate in shape, acuminate to an almost setaceous tip, tapered at the base into a petiole 2 cm. long, very scabrid on the margins, sparsely covered on both surfaces with whitish hairs from tubercle-bases, with a prominent white midrib; sheaths tight, terete, clasping, smooth and glabrous except on the ciliate margins, contracted towards the top to the petiole-base of the leaves, striate, rather loose in the lower part of the plant, and slipping from the clum; ligule rather stiff, oblong-truncate, up to 6 mm. long.

Inflorescence a panicle made up of 8–20 subdigitate racemes of spikelets 6–10 cm. long, each of which consists of a fragile jointed rhachis with a sessile and a pedicelled spikelet at each articulation; joints of the rhachis 3–4.5 mm. long, almost trigonous, slender, ciliate on the angles; pedicels as long or longer, similar in shape, with longer cilia on the angles. *Sessile spikelet* 4.5–5 mm. long; *lower glume* 4.5 mm. long, 1 mm. broad, 2-keeled with infolded margins, scabrid on the dorsal surface and coarsely scabrid on the keels, 6–8-nerved, deeply grooved on the dorsal surface almost to the tip; *upper glume* membranous to chartaceous, navicular, curved on the dorsal surface, oblong-acute in shape, 1–3-nerved, glabrous on the dorsal surface, scabrid on the keel on the dorsal surface near the tip. *Lower floret* ♂ or empty; *lemma* 3–4 mm. long, linear-obtuse in shape, hyaline, ciliate on the margins; *palea* half to two-thirds as long, linear, hyaline; *stamens* when present, 3; *anthers* 2.5–3 mm. long. *Upper floret* ♀; *lemma* 3 mm. long, split to the centre into 2 acute, hyaline, 3-nerved lobes, between which emerges a stout awn; *palea* almost 3 mm. long, hyaline, oblong-obtuse, ciliate on the margins; *stamens* 3; *anthers* 2.5–3 mm. long; *lodicules* 2, fleshy, truncate cuneate; *styles*; 2; *stigmas* plumose; *awn* 6–8 mm. long of which the lower half is chestnut coloured twisted base. *Pedicelled spikelet* 3.5 mm. long; *lower glume* lanceolate-acute, 6–8-nerved, slightly depressed on the back, scabrid on the dorsal surface and on the keels; *upper glume*, 3.5 mm. long, boat-shaped, 3-nerved, smooth on the dorsal surface; *lower floret* absent; *upper floret* ♂ and a miniature of the upper floret of the sessile spikelet.

IND. OR. : Khasi Hills, Mawphlang, 1700 m., 11 Sept. 1886, C. B. Clarke 44700C; Cherra, 1400 m., Jul. 1889, C. B. Clarke 40472; Shillong, 1700 m., 24 Aug. 1886, idem. 44652B; Boga Pani, 29 Jun. 1850, Hook. f. et T. Thoms.; Mawphlang Wood, 26 Oct. 1850, Hook. f. et T. Thoms.;

Garwhal, above Lotah, in forest, 2–2500 m., 22 Sept. 1885, *J. F. Duthie* 5051. Nepal, *Wallich* 8807 (Type).

BURMA : Nataung, *S. Kurz* 1209.

This fine species is very common in the hill forests above Shillong, Khasi Hills. It grows in dense shade and attains considerable lengths as it scrambles over shrubs and bushes towards the light. A feature of the lower part of the stem is the production of large numbers of stilt roots from the lower nodes.

It is the only species of the genus with a large upper lemma which is divided into two acuminate lobes.

2. *Microstegium vimineum* (Trin.) A. Camus in Ann. Soc. Linn. Lyon., n.s. **68**, 201 (1921).

Andropogon vimineus Trin. in Mem. Acad. Petersb. sér. 6, **2**, 268 (1832).

Microstegium willdenowianum Nees in Lindl. Nat. Syst. Bot. (ed. 2 of his Introd. Bot.) 447 (1836).

Pollinia imberbis Nees ex Steud. Syn. Pl. Glum. 410 (1855).

Pollinia willdenowiana (Nees) Benth., Jour. Linn. Soc. Bot. **19**, 67 (1881).

Eulalia viminea (Trin.) O. Ktze., Rev., Gen. Pl. **2**, 775 (1891).

Pollinia viminea (Trin.) Merr., Enum. Philipp. Pl. **1**, 35 (1922).

An annual grass, with an extensively creeping base, rooting at the lower nodes and sending up vertical culms from them. Culms up to 30 cm. tall, usually deeply channelled, slender or stout, smooth and glabrous or pilose under the panicle, extensively branching, shining, often striate, glabrous or puberulous at the nodes. *Leaf-blades* elliptic-acute or -acuminate or oblong-acute, contracted at the base into a very short petiole, covered on both surfaces with appressed soft short hairs, scaberrulose on the margins, up to 10 cm. long, 15 mm. broad ; *sheaths* shorter than the internodes, tight or more often, loose and slipping from the culms, smooth and glabrous below, hirsute on the margins above, contracted gradually towards the top to the base of the leaf, very striate, auricled at the mouth ; *ligule* a very short, lacerate membrane.

Inflorescence terminal and lateral, 1–5 racemes 3–5 cm. long, usually subdigitate, sometimes with a rhachis up to 2.5 cm. long, spreading or erect, made up of tardily fragile joints and pedicels ; joints 4–5 mm. long, strap-like, flat or slight convex on the outer surface, shortly ciliate along the edges ; pedicels similar in shape but only 3.5–4.5 mm. long. Sessile spikelets ♂ ; *lower glume* 5.5–6.5 mm. long, elliptic lanceolate-obtuse or elliptic-oblong, 2-keeled, shallowly channelled along the dorsal surface, 4-nerved, with prominent reticulate anastomosis, smooth and glabrous except for the scabrid and shortly ciliate keels above ; *upper glume* much compressed, boat-shaped, curved on the back, smooth and glabrous, except for the scabrid keel, 3–7-nerved, mucous or very shortly awned above. *Lower floret* absent or represented by an empty scale, oblanceolate-oblong in shape, hyaline, 3.5 mm. long. *Upper floret* ♂ ; *lemma* 1–1.5 mm. long, very narrow, hyaline with a very stout awn issuing from the 2-toothed tip or awnless ; *palea* a small scale 1–1.25 mm. long, hyaline ; when awnless the lemma is a minute, ovate-lanceolate scale or

subquadrate ; *stamens* 3 ; *anthers* 0.5 mm. long, occasionally larger ; *styles* 2 ; *stigmas* plumose ; *caryopsis* 2 mm. long, terete ; *embryo* quarter the length of the grain ; *hilum* basal, punctiform ; *lodicules* 2, cuneate, truncate or 2-lobed. *Pedicelled spikelet* ♂, very similar to the sessile, often much smaller or rudimentary.

IND. OR. : Shillong, 1500 m., 8 Sept. 1944, *N. L. Bor* 18130. In shade of trees ; Shillong 1700 m., 1 Oct. 1885, *C. B. Clarke* 43581 and 45315 ; Kalapani, *C. B. Clarke* 19010B.

SIKKIM : Chalong, Oct. 1849, *J. D. Hooker* ; Choongtum, 27 Oct. 1849, *J. D. Hooker*.

NEPAL : *Wallich* 8832 (Type).

The very small anthers of this species are most remarkable, and from the fact that they are most often found adhering to the apex of the grain, it seems as if the plant is at times, if not always, cleistogamous. Hackel called this plant *Pollinia imberbis* Nees, overlooking the name *Andropogon vimineus* given to it by Trinius in 1832. Hackel has two varieties of this species. The variety "*genuina*" has the sessile spikelets awned and this variety has not been collected south of the Himalaya. The other variety "*willdenowiana*" is the awnless form. All specimens so far collected in the Khasi and Naga Hills conform, but this variety is not entirely confined to the areas south of the Himalaya, for the type of the variety itself, *Pollinia willdenowiana*, was collected in Nepal.

3. *Microstegium stapfii* (Hook. f.) A. Camus in Ann. Soc. Linn. Lyon., n.s. 68, 200 (1921).

Pollinia stapfii Hook. f., Flor. Brit. Ind. 7, 115 (1896).

A perennial (?) grass. Culms erect from a long prostrate base which roots at the swollen nodes, smooth and glabrous, polished, branching and rebranching. *Leaf-blades* 10–15 cm. long, up to 2 cm. broad, flat, flaccid, thin, elliptic, setaceously acuminate, contracted below into a broad petiole, scabrid on the margins, sparsely covered on the upper surface with hairs from tubercle-bases, thickly covered on the lower surface with short appressed hairs ; midrib prominent on the upper surface, very minutely scaberulous or smooth on both surfaces ; *sheaths* much shorter than the internodes, scarious below and falling from the internodes, tight at the upper nodes, clasping the stems, striate, smooth and glabrous below, densely hairy on the margins above and contracted to the petiole of the leaf ; *ligule* a short membrane, ciliate on the upper margin.

Inflorescence of 6–9 subdigitate, hairy racemes, 4–7 cm. long, supported at the base by 3–4 pairs of homomorphous more or less glabrous spikelets, each consisting of a fragile rhachis of hollow clavate joints and pedicels with a sessile and a pedicelled spikelet at each articulation ; joints and pedicels about 4.5 mm. long, hollow, inflated in the upper half, covered on the outer surface and on the angles with very dense fulvous-coloured hairs, glabrous and flat on the inner surface, about 4.5 mm. long. *Sessile spikelet* seated on a callus 0.5 mm. long ; *lower glume* 4 mm. long, 1 mm. wide, elliptic-obtuse in profile, strongly 2-keeled, 4-nerved, with a prominent interlacing anastomosis between the nerves, densely ciliate, with stiff fulvous hairs, depressed along the middle line of the dorsal

surface, with infolded hyaline flaps; *upper glume* 4 mm. long, shortly bifid at the apex and provided with a short arista from the sinus, boat-shaped, compressed, curved on the back, smooth and glabrous in the lower third, very hirsute above with fulvous hairs in the upper two-thirds. *Lower floret* entirely absent. *Upper floret* ♂; *lemma* a very small, hyaline scale, 2-toothed, aristate; *palea* a small, lanceolate, hyaline scale, 1.5 mm. long; awn 2 cm. long, of which 6 mm. form a chocolate-brown, twisted column; *styles* 2, very long; *stigmas* plumose *stamens* 3; filaments only seen. *Pedicelled spikelets*; *lower glume* 3 mm. long, elliptic-truncate in outline, obtusely 2-keeled, convex on the back, hirsute on the dorsal surface; *upper glume* 3 mm. long, very strongly compressed, boat-shaped, curved on the back; *lower floret* absent; *upper floret* containing a rudimentary ovary with long styles and small plumose stigmas; *lemma* very minute, hyaline; *arista* slender, 11 mm. long, lower half brown, twisted. *Basal sessile spikelet*; *lower glume* 4 mm. long, 0.75 mm. wide, linear- or elliptic-oblong, truncate, slightly depressed on the dorsal surface, 2-keeled, scabrid on the keels, minutely puberulous on the dorsal surface, 4-5-nerved, with conspicuous anastomosis between the nerves; *upper glume* as long as the lower, boat-shaped, strongly compressed, 3-nerved, smooth and glabrous on the surface, scabrid on the keel; *lower floret* absent; *upper floret* rudimentary; *lemma* lanceolate with a setaceous tip or a rudimentary awn; *ovary* rudimentary with long styles and plumose stigmas.

BURMA: Arakan, low sandstone hills, opposite Akyab, Oct. 1869, S. Kurz (Type).

This remarkable species has only been collected on the sandstone hills behind Akyab. It must be an extremely beautiful grass with its sub-digitate racemes of spikelets covered with golden brown hair and the lower glumes of the sessile and pedicelled spikelets, prettily marked with green, anastomosing veins on a pale yellow background. It has the inflated joints and pedicels of *M. eucnemis* (Nees ex Steud.) Henr. but apart from the hairiness of the racemes, the lower glumes of the sessile spikelets are not so deeply grooved, and the lower pair of sterile spikelets and tough rhachis are absolutely distinctive. No stamens have been seen, but it appears from the presence of anther filaments in the upper floret of the sessile spikelets, that this floret is hermaphrodite. There is no trace of lower lemma or palea.

4. *Microstegium eucnemis* (Nees ex Steud.) A. Camus in Ann. Soc. Linn. Lyon., n.s. **68**, 200 (1921).

Pollinia eucnemis Nees ex Steud. Syn. Pl. Glum. 409 (1855).

Eulalia eucnemis (Nees) O. Ktze., Rev. Gen. 775 (1891).

Coelarthron brandisii Hook. f. in Hook. Icones Pl. sub tab. 2517 (1897).

Microstegium brandisii (Hook. f.) Rhind, Grasses of Burma, 62 (1943).

A perennial (?) grass. Culm up to 130 cm. tall, stout, terete, smooth and glabrous, polished, erect, glabrous at the nodes. *Leaf-blades* up to 25 cm. long, 25 mm. broad, elliptic-acuminate in shape, petioled at the base, scabrid on the margins, scaberulous or scabrid or smooth on both surfaces, sparsely covered on both surfaces with longish hairs from tubercle-bases; *sheaths* shorter than the internodes, somewhat loose,

becoming scarious below, or tight, contracted at the top to the petiole of the blade, smooth, glabrous and shining or with a few tubercle-based hairs above, striate ; *ligule* a row of stiff hairs.

Panicle of few to many (25) subdigitate racemes of spikelets ; racemes up to 9 cm. long, consisting of a fragile, jointed rhachis with a sessile and a pedicelled spikelet at each articulation ; joints and pedicels inflated, obpyriform, shining on the outer surface, hollow, flattened on the inner surface, ciliate along the margins with purplish-white hairs ; joints and pedicels 3 mm. long. *Sessile spikelet* laterally compressed, 4 mm. long ; *lower glume* 3.5 mm. long, 0.75 mm. wide, elliptic-acute in shape, sharply 2-keeled, densely ciliate along the keels in the lower three-quarters, scabrid above, with the margins infolded at the keels, deeply grooved on the dorsal surface, chartaceous in texture, glabrous on the dorsal surface except towards the tip where it is puberulous and scabrid, often with a network of veins at the tip ; *upper glume* strongly compressed, boat-shaped, chartaceous, 4 mm. long, 3-nerved, smooth and glabrous, curved on the back, minutely 2-toothed and with an antrorsely scabrid awn issuing from the sinus. *Lower floret* ♂ ; *lemma* absent ; *palea* 3.5 mm. long, lanceolate, chartaceous, nerveless or obscurely 2-nerved, not at all keeled, concave on surface towards the lower glume, ciliate on the margins above, smooth and glabrous ; *stamens* 3 ; *anthers* 3-3.5 mm. long ; *upper floret* ♀ ; *lemma* 1-1.25 mm. long, very narrow, 2-toothed or 2-lobed, with a stout awn issuing from the sinus ; *awn* 15 mm. long of which half is twisted, chestnut-coloured column ; *palea* a hyaline, obovate, ciliate scale shorter than the lemma ; *styles* 2, very long ; *stigmas* plumose. *Pedicelled spikelet* ; *lower glume* 2.75 mm. long, elliptic-obtuse in shape, 2-keeled, flat on the back, ciliate on the keels ; *upper glume* boat-shaped, rounded on the back, elliptic-acute, apiculate, 2.75-3 mm. long, hyaline ; *lower floret* absent ; *upper floret* ♂ ; *lemma* a very minute 2-toothed scale, awned ; *palea* a minute, hyaline scale ; *stamens* 3 ; *anthers* 2-2.5 mm. long ; *awn* 5 mm. long, imperfect.

BURMA : Prome, Wallich 8812 (Type) ; Pegu, Scott ; Popan District, Oct. 1888, H. Collett 9 ; High ground generally with teak (Type of *Coelarthron brandisii* Hook. f.) Brandis 1883 ; Insein Division, 4 Dec. 1927, H. G. Champion. "An invasive grass in taungyas".

I have come to the conclusion that *Microstegium brandisii* (Hook. f.) Rhind (*Coelarthron brandisii* Hook. f.) is conspecific with *M. eucnemis* (Nees ex Steud.) Henr. I can find no significant difference between the spikelets of the type of Hooker's species and those of gatherings of *M. eucnemis*. I consider that the type of *Coelarthron brandisii* Hook. f. is a weak plant of *Microstegium eucnemis* flowering perhaps in its first year.

This opinion is strengthened by another gathering of this plant, made by H. G. Champion in 1927 in the *taungyas* of Insein Division in Burma. Half a dozen specimens are represented, some of which have one raceme and the remainder 2-3 racemes. The single-racemed individuals agree with the type of *Coelarthron brandisii* Hook. f., while the others would most certainly be identified as *Microstegium eucnemis* (Nees ex Steud.) Henr., which seems to prove that the feature of a single raceme is valueless for diagnostic purposes. As this is the only difference between *M. eucnemis* and *M. brandisii*, I have no hesitation in sinking the latter in the synonymy of the former.

5. *Microstegium vagans* (*Nees ex Steud.*) A. Camus in Ann. Soc. Linn. Lyon., n.s. **68**, 200 (1921).

Pollinia vagans Nees ex Steud. Syn. Pl. Glum. 410 (1855).

P. montana Nees ex Steud. Syn. Pl. Glum. 409 (1855).

Ephebopogon gratus Nees et Meyer ex Steud. Non. ed. 2, **1**, 556 (1840).

Pollinia grata Hack. in DC. Monogr. Phan. **6**, 175 (1889).

Eulalia vagans (Nees) O. Ktze., Rev. Gen. 775 (1891).

Microstegium gratum (Hack.) A. Camus in loc. cit. 201.

A perennial grass, creeping at the base and rooting from the nodes. Culms up to 90 cm. tall (exceptionally to 300 cm. long) terete, smooth and glabrous or hirsute at the nodes, striate, branched, or not. *Leaf-blades* linear-acuminate, soft, flat, flaccid, narrowed at the base to a stout petiole, up to 23 cm. long, 20 mm. broad, sparsely covered on both surfaces with short hairs from tubercle-bases, scabrid on the margins, minutely scaberulous on both surfaces, with a prominent shining mid-rib; *sheaths* tight or the lower slipping from the culms, smooth and glabrous or more or less hirsute with tubercle-based hairs, contracted at the top to the petiole-like base of the blade; *ligule* a short membrane, lacerate at the top.

Inflorescence of 5–25 terminal racemes, 5–10 cm. long, arranged subdigitately at the tip of a stout, glabrous and shining peduncle; racemes consisting of a fragile rhachis, at each articulation of which is seated a sessile accompanied by a pedicelled spikelet; callus hairs of sessile spikelet one-third to half as long as the spikelet; joints of the rhachis clavate, not inflated, 2–3 mm. long, flattened on the internal side, convex outwards, ciliate on the two edges, hairs half as long as the joint; pedicels similar to the joints but shorter. *Sessile spikelet* ♀; *lower glume* 3–4 mm. long, 1–1.3 mm. broad, oblong-elliptic truncate, obtuse or 2-toothed, 2-keeled, with inturned flaps, flat and channelled on the dorsal surface, long, ciliate on the keels on the upper half, 4-nerved; *upper glume* 4–4.5 mm. long, 3-nerved, strongly compressed and keeled, smooth and glabrous on the dorsal surface, scabrid and ciliate on the keel, particularly above, mucronate. *Lower floret* empty or ♂; *lemma* absent or a minute scale; *palea* concave towards the glume, nearly as long, oblong-acute, containing 3 stamens or empty. *Upper floret* ♀; *lemma* extremely minute, merely a tiny scale which may be called the expanded base of the stout awn; *palea* an elliptic-oblong-obtuse, ciliate, hyaline scale; *styles* 2; *stigmas* plumose; *stamens* 3; *anthers* 2–2.5 mm. long; awn 14 mm. long, of which half is chestnut coloured, twisted column. *Pedicelled spikelet*; *lower glume* similar to that of the sessile spikelet but smaller; upper glume navicular, compressed, 3-nerved. *Lower floret* entirely absent. *Upper floret*; *lemma* a minute hyaline scale, aristate; *palea* lanceolate-obtuse, 2 mm. long; *stamens* 3; *anthers* 2 mm. long; awn about 6 mm. long, of which half is twisted, stouter, chestnut-coloured column.

IND. OR.: Nepal, Wallich 8807B. (Type of *P. vagans*); Khasi Hills, Cherra, 20 Oct. 1871, 1300 m., C. B. Clarke 15648A; Bogapani 27 Oct. 1850, Hook. f. and T. Thoms. Sikkim, Hook. f. Assam, Griffith nos. 971, 1074, 1098, collected 1835–36; Mishmi, Kashoo, Griffith. Khasi Hills,

Kanjilal 4493 ; Syong, 25 Oct. 1850. Hook. f. and T. Thoms. (Type of *Pollinia grata* Hack.).

BURMA : Katha, Bilumyo Reserve, 200 m., 16 Nov. 1912, *J. H. Lace* 6031 ; Tonkyeghat, Palawa Zeik, *S. Kurz* 1208 ; Tonkyeghat, Palawa Zeik, idem 1207. (Type of *Pollinia grata* Hack. var. *hirsuta* Hack.).

This species is nearest to *P. ciliata* Trin. but the smaller anthers of the latter and its comparative slenderness combine to give it a very different facies. This is combined with a difference in habit, for *M. ciliatum* (Trin.) A. Camus is a gregarious plant, while *M. vagans* (Nees) A. Camus is not often found in large patches.

Apart from the hirsute nodes, and rather more hairy racemes, *Pollinia grata* Hack. does not differ in any material respect from *P. vagans* Nees, and I therefore have no hesitation in bringing them together. The specimen which Hackel called *P. grata* var. *hirsuta*, an extremely hairy form, is diseased, being attacked by an insect and possibly by a fungus as well. This specimen was collected immediately preceding a specimen of *M. vagans* (Nees.) A. Camus, which probably indicates that the hairiness is brought about by its diseased condition.

P. vagans Nees ex Steud. Syn. Pl. Glum. 410 (1855) is a species which has been much confused. It is based upon sheet no. 8807B from Wallich's Nepal collection. Hackel has two varieties, var. *genuina* and var. *dubia*. These varieties are distinguished from one another by the hairiness of the joints, glumes and callus and the comparative length of the joints. As all of these are very variable as regards their hairy covering, there does not seem to be any use in keeping the varieties up.

6. *Microstegium ciliatum* (Trin.) A. Camus in Ann. Soc. Linn. Lyon., n.s. **68**, 201 (1921).

Pollinia ciliata Trin. in Mem. Acad. Petersb. ser. 6, **2**, 306 (1832).

P. lancea Nees ex Steud. Syn. Pl. Glum. 410 (1855).

P. laxa Nees ex Steud. Syn. Pl. Glum. 410 (1855).

Andropogon biaristatus Steud. Syn. Pl. Glum. 379 (1854).

P. wallichiana Nees ex Steud. Syn. Pl. Glum. 410 (1855).

P. monantha Nees ex Steud. Syn. Pl. Glum. 410 (1855).

Eulalia monantha (Nees) O. Ktze., Rev. Gen. 775 (1891).

E. ciliata (Trin.) O. Ktze. loc. cit.

Microstegium monanthum (Nees ex Steud.) A. Camus in Ann. Soc. Linn. Lyon., n.s. **68**, 200 (1921).

M. biaristatum (Steud.) Keng in Sinensia **3**, 92 (1932).

A perennial grass, prostrate below, straggling, rooting at the lower nodes, often climbing over other vegetation. Culms up to 120 cm. tall, often much branched, terete, smooth and glabrous, shining, glabrous at the nodes. Leaf-blades up to 15 cm. long, 8 mm. wide, linear-acuminate, or narrowly elliptic-acuminate, almost setaceous, contracted at the base to the sheath, often definitely petioled, with a shining white mid-rib, most often quite glabrous save for some coarse tubercle-based hairs on the upper surface near the junction with the sheaths, sometimes with a few widely spaced hairs from tubercle-bases on both surfaces, scabrid along

the margins and minutely scaberulous or even smooth on both surfaces, green, occasionally drying reddish; *sheaths* wrapped round the culms, tight, contracted at the tip to the petiole-like base of the blade, markedly striate, very smooth, glabrous and shining, or more or less hairy from tubercle-based hairs; *ligule* membranous, 0.5 mm. long.

Inflorescence of few to many (20) more or less digitately arranged racemes 5–8 cm. long, each consisting of a fragile articulated rhachis upon which are seated a sessile and a pedicelled spikelet at each articulation; joints of the raceme slender, gradually dilated towards the tip, flattened on the inner surface, the outer surface glabrous or more usually ciliate all along the edges with pale or purplish hairs which are much shorter than the joint itself, which is 2.5–3.5 mm. long; pedicel similar to the joint but shorter. *Sessile spikelet* 3–4 mm. long, with a short (0.5 mm.) callus which is usually naked, but occasionally bearded with short hairs; *lower glume* 3–4 mm. long, 0.6–1 mm. wide, 2-keeled, oblong, acute, obtuse or 2-toothed at the tip, 4-nerved, dorsally channelled, glabrous on the dorsal surface, with inturned flaps; *upper glume* 3–4 mm. long, strongly compressed, navicular, with a short (1.5–4 mm. long) bristle at the tip, 3-nerved, curved on the back, smooth and glabrous except for the scabrid keel. *Lower floret* completely absent or very rarely present, when it then consists of a hyaline palea somewhat shorter than the glume. *Upper floret* ♀; *lemma* a minute (0.5 mm. long) hyaline scale, from the 2-toothed tip of which emerges an awn which is 6–12 mm. long, the lower third being chestnut-brown in colour and twisted; *stamens* 3; *anthers* 1–1.8 mm. long; *styles* 2; *stigmas* plumose; *palea* a subquadrate, hyaline scale. *Pedicelled spikelet* smaller than the sessile but very similar to it. The single floret is sometimes male, sometimes hermaphrodite, and the awn is weaker and shorter.

Representative specimens.

IND. OR. : Assam : Khasi Hills, Amwee, 27 Sept. 1850, *Hook. f. and T. Thoms.*; Nungkhlaio, 1300 m., 30 Oct. 1872, *C. B. Clarke* 17712E; towards Nowgong, 18 Nov. 1835, *Griffith*; Mamloo, idem; Sylhet, *Wallich* 8822 (Type of *Pollinia wallichiana* Nees); Naga Hills, Mongsemdì, 1400 m., 20 Sept. 1942, *N. L. Bor* 16693; Lakhipur, Nov. 1907, *G. Mann* 691.

Sikkim : Roshi to Rinchingpong, 1 Oct. 1862, 600–1600 m., *T. Anderson* 1377; Lachung, 2 Oct. 1849, *Hook. f.* :—woods, 2000 m.; Sunil, 1600 m., 1881, *G. King*; Sureil, 1600 m., *G. S. Gamble* 9925; Mongpu, 1300 m., 2 Oct. 1884, *C. B. Clarke* 36136C.

Madras : Herb. Wight 3428; Shembaganur, 1900 m., July, *Saulières* 1142; Pallode, Nov. 1901, *A. G. Bourne*; Kodaikanal, Pillarijarsuthu, Dec. 1905, *C. A. Barber* 7711.

Bihar : Parasnath, 1400 m., 10 Oct. 1883, *C. B. Clarke* 33794F.

N.W. India : Dehra Dun, 31 Oct. 1888, *J. F. Duthie* 7749; Garhwal, below Kinoli, 1600 m., 22 Sept. 1885, *J. F. Duthie* 5050; Rajaori, 1830, *V. Jacquemont* 1335 :—in nemoribus siccis.

Nepal : *Wallich* 8823 (Type of *Pollinia laxa* Nees and *Andropogon biaristatus* Steud.); *Wallich* 8815B and 8831 (Type of *Pollinia lancea* Nees ex Steud.); *Wallich* s.n. in Herb. Hook. (Type of *Pollinia ciliata* Trin.).

Ceylon : Kandy, 25 Jan. 1927, *A. H. G. Alston* 1097 ; Hanasgiriya, 21 Dec. 1926, *idem* 427 ; Ceylon Plants, *Thwaites* 950.

BURMA : Pegu Yoma, 21 Jan. 1868, *S. Kurz* 1208 ; Rangoon, McClelland in Herb. Hook. ; Moulmein, *Griffith* in Herb. Hook. ; Tongdong, near Ava, *Wallich* 8819 (Type of *Pollinia monantha* Nees ex Steud.).

This species, as its distribution indicates, is a common grass in India. It is by far the most frequent grass in the *sal* forests of Bengal and Assam, in places where the *sal* trees and their associates have formed a closed canopy. In such circumstances the grass exists in a thick mass through which the young *sal* seedling is unable to grow. Evergreen shrubs, on the other hand, in the wetter parts, seem to be able to tolerate and even to take advantage of these conditions. The result is that as the *sal* forest grows older the evergreen undergrowth becomes thicker. In the drier areas, where the soil and subsoil consist of an immense depth of waterworn debris, such as in the ' bhabar ' tract of Assam, the undergrowth in the magnificent *sal* forest is a sea of *M. ciliatum*, in which a few miserable *sal* seedlings eke out a precarious existence.

Pollinia monantha Nees ex Steud., transferred to *Microstegium* by A. Camus, is based upon sheet no. 8819, collected by Wallich at Tong Dong, near Ava in Burma. The type is at Kew. With regard to this plant, Hook. f. remarks that it resembles *P. ciliata* but the spikelets are much smaller. An examination of the type-sheet, however, shows that although the spikelets in two of the panicles are about 2·5 mm. long, those in the third panicle are up to 3 mm. long. They therefore come into the range of spikelet size into which *P. ciliata* fits. As there are no other differences by which it can be separated from *P. ciliatum* (Trin.) A. Camus, the name *M. monanthum* (Nees ex Steud.) A. Camus will have to be sunk in the synonymy of the former.

7. *Microstegium delicatulum* (Hook. f.) A. Camus in Ann. Soc. Linn. Lyon., n.s. **68**, 200 (1921).

Pollinia delicatula Hook. f. in Flor. Brit. Ind. **7**, 117 (1896).

A weak straggling annual. Culms creeping below and rooting from the lower nodes, repeatedly branching, finally erect, very slender, smooth and glabrous, striate ; hairy at the nodes. Leaf-blades narrowly elliptic or linear elliptic, acuminate at the apex, acute at the base, up to 10 cm. long, 8 mm. broad, weak and flaccid, flat, sparsely hairy on the upper surface with hairs from tubercle bases, with a few stouter hairs at the base, more hairy below and the hairs shorter, scabrid on the margins and on the surfaces ; sheaths on the upper part of the culm tightly wrapped round the internode, glabrous but densely ciliate on the margins, smooth or minutely scabrid, lower down and at the base the sheaths are very loose and slip away from the culms, contracted towards the top to the base of the leaf ; ligule membranous, very short, not more than 0·5 mm. long.

Inflorescence a panicle of 3-5 digitate, erect or drooping racemes ; racemes consisting of a fragile rhachis with a sessile and a pedicelled spikelet at each articulation ; joints and pedicels flattened, 2-angled, somewhat wider at the top, ciliate on the angles, the former about 1·5 mm. long, the latter 1 mm. long, bearded at the articulations. Sessile spikelet oblong, obtuse, 2·5 mm. long, with a very short callus, bearded

on the callus with weak, white hairs half as long as the spikelet ; *lower glume* shape and length of the spikelet, chartaceous, obscurely nerved, pale in colour, obscurely keeled below but sharply keeled above and ciliate on the keels, smooth and glabrous or scabrid towards the apex, flat, slightly convex or shallowly channelled on the dorsal surface, 4-nerved ; *upper glume* 2.5 mm. long, boat-shaped and compressed laterally, straight on the back, curved towards the tip, very minutely scabrid and ciliate on the keel towards the tip, very shortly mucronate, obscurely 3-nerved. *Lower floret* completely absent. *Upper floret* ♂ ; *lemma* extremely minute, orbicular, hyaline, prolonged into an awn 6–8 mm. long, of which the lower 3.5–4 mm. are chestnut-brown in colour and twisted ; *palea* if present an extremely minute hyaline scale ; *stamens* 3 ; *anthers* 1 mm. long ; *styles* 2, long ; *stigmas* plumose. *Pedicelled spikelet* very similar to the sessile spikelet, containing an awned ♂ floret or quite often reduced and barren.

BURMA : Pegu Yoma to Thounggyi, *S. Kurz* 1204 (Type) ; Rangoon' 13 Jan. 1854, *McClelland*.

These two sheets have been carefully compared with the type of *Pollinia monantha*, and although the spikelets are of comparable size, there is no doubt that *Pollinia delicatula* is distinct. Apart from the lower glumes of the sessile and pedicelled spikelets being for the most part flat or even convex on the back, occasionally channelled, the shape of the joints of the raceme and the pedicels of the pedicelled spikelets are quite different, being much longer and of a different shape.

8. *Microstegium nudum* (Trin.) A. Camus in Ann. Soc. Linn. Lyon., n.s. **68**, 201 (1921).

Pollinia nuda Trin. in Mem. Acad. Petersb. sér. 6, **2**, 307 (1832).

P. japonica Miq. in Ann. Mus. Lugd. **2**, 290 (1866).

Leptatherum royleanum Nees in Proc. Linn. Soc. **1**, 93 (1841).

L. japonicum Franch. et Savat., Enum, Pl. Jap. **2**, 190 (1879).

Eulalia nuda (Trin.) O. Ktze. Rev. Gen. 775 (1891).

A very slender annual grass, decumbent at the base and rooting at the lower nodes. Culms terete, up to 100 cm. tall, very smooth and glabrous, channelled on one side, branched, glabrous at the nodes. *Leaf-blades* lanceolate-elliptic or lanceolate, acute, more often acuminate, up to 6 cm. long, 3–10 mm. wide, smooth and glabrous, or with a few tubercle-based hairs on the upper and lower surfaces, minutely to very scabrid on the cartilaginous margins, with a rather inconspicuous midrib, contracted at the base into a very short petiole ; *sheaths* very loose in the lower part of the stem and slipping from the internodes, rather tight above and clasping the stem, markedly striate, glabrous on the dorsal surface but hirsutely ciliate with tubercle-based hairs on the margins, contracted at the top to the petiole-like base of the blade ; *ligule* membranous, 0.75 mm. long, very shortly ciliate on the upper margin.

Inflorescence of 3–6 racemes irregularly arranged, somewhat distant on a short, angled, glabrous or minutely puberulous axis, 1–2 cm. long ; racemes up to 8 cm. long, slender, flexuous, at first crowded, finally standing at right angles to the common axis, each consisting of a fragile rhachis with a sessile and a pedicelled spikelet at each articulation, joints

slender, filiform, rounded or angled, glabrous, up to 7 mm. long; pedicels much shorter than the joints but similar in shape. *Sessile spikelet* narrowly lanceolate in shape, 3–4.8 mm. long, awned, with a callus 0.5 mm. long; callus bearded with short hairs; *lower glume* 3–4.5 mm. long, lanceolate in shape, truncate, obtuse or 2-toothed at the apex, 4-nerved, shallowly channelled on the dorsal surface, 2-keeled; keels rounded; *upper glume* elliptic acute, as long as the lower glume, boat-shaped, 3-nerved, smooth and glabrous, scaberulous on the keel. *Lower floret* absent or barren; *lemma* if present hyaline, lanceolate; *palea* absent. *Upper floret* ♂; *lemma* hyaline, 1.5–2 mm. long, linear, elliptic or lanceolate in shape, not 2-toothed at the tip, ending in a long, 15–18 mm. long, capillary flexuous awn; *palea* usually absent, if present a minute subquadrate scale; *stamens* 2; *anthers* small, about 1 mm. long; *styles* 2; *stigmas* plumose. *Pedicelled spikelet* very similar to the sessile spikelets, pedicel 2–3 mm. long.

IND. OR. : Sikkim : Yoksun, 1850 m., 10 Oct. 1875, *C. B. Clarke* 25298B; Mintagong, 1500 m., 3 Oct. 1875, *C. B. Clarke* 24932A; Lachoong, 2000–2300 m., 2 Oct. 1849, *Hook. f.*

Khasia : Nunkhlao, 18 Oct. 1850, *Hook. f. & T. Thoms*; Mamloo, 27 Oct. 1835, *Griffith*; Sohta Rin, 1600 m., 17 Oct. 1872, *C. B. Clarke* 19029G.

N.W. India : Kashmir, Basarli, 1500 m., 25 Sept. 1876, *C. B. Clarke* 31555A; Jhelum Valley, 1600 m., 24 Sept. 1875, *C. B. Clarke* 11037A; Murree Hills, Ghora Gali, 2100 m., 3 Oct., 1931, *R. R. Stewart* 12395.

Madras : Pulneys, Penya Shola, 4 Dec. 1898, *A. G. Bourne*; Perumale, 1600 m., Nov. *Van Malderen* 1284.

Nepal : *Dr. Wallich* (Type).

NOTES ON ASIATIC GRASSES : VI.

A new Species of *Poa* from Sikkim.

N. L. BOR.

***Poa polyneuron* Bor**, sp. nov. ab omnibus speciebus hujus generis lemmatibus 5–7-nervibus distincta.

A perennial grass. *Culms* up to 30 cm. tall, slightly decumbent at the base, covered by the sheaths almost to the panicle, smooth and glabrous, terete, glabrous at the nodes. *Leaf-blades* linear, tapering abruptly to a hooded apex, dark brown in colour when dry, up to 5 cm. long, 5 mm. broad, lower spreading, the upper ascending, smooth and glabrous on both surfaces, minutely to coarsely scabrid on the margins and on the mid-rib beneath towards the stout, blunt tip. *Sheaths* rather loose, the lower short and scarious, breaking up into fibres, the upper longer than the internodes, smooth and glabrous, markedly striate. *Ligule* pointed, brown, membranous, 2 mm. long.

Inflorescence a loose panicle issuing from the topmost leaf-sheath ; branches bare in the lower half, smooth and glabrous, or minutely scabrid towards the tips, 2-nate. *Spikelets* 5.5–7 mm. long, 3–4-flowered, compressed, elliptic in shape. *Lower glume* 4.5–5 mm. long, 1.6–1.8 mm. wide when flattened, curved on the keel, narrowly elliptic-acute, smooth and glabrous on the dorsal surface, scabrid on the keel towards the tip, 3-nerved, hyaline on the margins. *Upper glume* 5 mm. long, 3 mm. broad when flattened, broadly ovate-acute in shape, straight on the keel, smooth and glabrous on the dorsal surface, scabrid on the keel towards the tip, 3–5-nerved, the outer pair of 5 very slender, the intermediate pair almost as long as the keel nerve. *Lemma* broadly elliptic-acute when flattened, 5 mm. long, 3 mm. broad, slightly curved on the back, 5-more-nerved, with two very conspicuous nerves on each side, the intermediate ones being fainter, very broadly hyaline on the margins and at the tip, ciliate on all nerves and on the keel in the lower two-thirds, covered with a dense mat of hairs on the dorsal surface in the lower half. *Wool* apparently absent. *Anthers* linear, 2.5 mm. long. *Rhachilla* smooth and glabrous. *Palea* as long as the lemma, narrowly elliptic-truncate, 2-keeled, scabrid on the keels in the upper half, shortly pilose in the lower half, pilose on the surface between the keels. *Lodicules* 2, large, truncate or lobed.

IND. OR. : Sikkim ; Natu La, 4,000 m., 23 Jun. 1945, *Bor et Kiratram* 20685 (Typus in Herb. Kew.).

Tibet : Chubitang, 4,000 m., 23 Jun. 1945, *Bor et Kiratram* 20575.

A fine species of which the two above are the only gatherings. The linear leaves distinguish it at once from *Poa gammieana* Stapf, a species to which it has a superficial resemblance.

This species departs from the usual conception of *Poa* in its 5-several-nerved lemmas but agrees in all other characters. As it is known, however, that gall-forming nematodes and fungal attack occasion abnormal growth of parts of the spikelet in other species of grass, it was considered advisable to make certain that the specimens were not attacked in this way. Accordingly they were submitted to Dr. T. Goodey, F.R.S. of Rothamsted, who had expressed his readiness to examine them for signs of nematode infection. After a careful examination Dr. Goodey assured me that there was no sign whatever of galling. There is also no evidence of fungal infection. Hence this grass is being described as a new species.

NOTES ON ASIATIC GRASSES : VII.

Coelachyrum Hochstett. et Nees, a genus of grasses new to Pakistan.

N. L. BOR

One of the plants collected by Edwin Pierce in Beluchistan in 1880, was a grass new to science for which Bentham proposed the name *Eragrostis Piercei* Benth. A description and an illustration were published in Hooker's *Icones Plantarum* in 1881.

Although Bentham and Hooker, in the *Genera Plantarum*, considered *Eragrostis* and *Coelachyrum* to be synonymous, there can be little doubt that they are better kept apart, and this is the accepted position at the present time.

The remarkable grain of *Coelachyrum* provides the strongest grounds for considering the genus to be different from all others in the *Eragrostaceae*, and indeed from all those in the *Pooideae*. The grain is elliptic or orbicular in outline, it is deeply concave on the adaxial surface and hemispherical on the deeply wrinkled abaxial surface. The excavation on the adaxial surface is doubtless brought about by the pressure of the dorsal surface of the lemma next above, due to the development within it of the comparatively large seed. The rhachilla of the spikelets is jointed above the glumes and between the florets so that, when mature, the caryopses, loosely enclosed in the lemma and palea, fall away from the glumes which are left on the tough rhachis and branches.

The species are inhabitants of some of the hottest and driest parts of the globe, and the perennial species must be possessed of exceptional powers of resistance to desiccation.

GENERIC DESCRIPTION.

Coelachyrum Hochstett. et Nees

Spikelets solitary, shortly pedicelled, thickly crowded and secund on the short, ascending, often curved branches of a contracted or somewhat spreading panicle, or else widely spaced on the long, spreading branches of a very loose panicle, 4-14-flowered, ovate in outline, rather plump ; rhachilla jointed above the glumes and between the florets ; florets much imbricate. *Glumes* more or less equal, herbaceous, lanceolate, ovate or broadly elliptic in shape, curved on the back when mature, the lower 1-nerved, the upper 3-nerved, with the median nerve of the latter or both produced as a mucro or not, both hyaline on the margins. *Lemmas* somewhat similar to the upper glume, often suffused with yellow or violet, broadly elliptic when flattened, apiculate, 3-nerved, with the lateral pair bright green and close to the margins, compressed when young, rounded on the back below, very plump when mature, herbaceous, smooth and glabrous or shortly hairy on the dorsal surface in the lower half, or the lateral nerves and the keel long and densely ciliate ; *palea* as long as the lemma, broadly oblong-elliptic in shape, obtuse, 2-nerved, smooth and glabrous or long ciliate on the keels, glabrous or minutely hairy on the adaxial concave surface ; *stamens* 3 ; *anthers* linear ; *styles* 2 ; *stigmas* plumose ; *grain* compressed, concavo-convex, elliptic or orbicular

in outline, deeply excavated on the adaxial face, strongly wrinkled on the abaxial surface, dark reddish-brown in colour ; *hilum* basal, punctiform ; *embryo* linear-oblong, about two-thirds the length of the circular grain ; *lodicules* 2, cuneate, truncate, almost quadrate, with one angle often produced as a tooth.

Annual or perennial grasses, often stoloniferous, mostly decumbent at the base, then erect. Leaves lanceolate-acuminate or elliptic-acute, glabrous or sparsely covered with tubercle-based hairs ; *sheaths* tight above, loose below, breaking up into fibres ; ligule a lacerate membrane.

Three or four species inhabiting the hotter and drier parts of Arabia, British Somaliland and Abyssinia.

Coelachyrum piercei (*Benth.*) *Bor.* comb. nov. *Eragrostis piercei* Benth. in Hook. Ic. Pl. sub tab. 1370 (1881).

A perennial grass with extravagant innovations. Culms up to 45 cm. tall, thickly crowded at the base, at first somewhat decumbent, then erect, very leafy below, sparsely leafy above, terete, smooth and glabrous, branching at the glabrous nodes, with very long internodes. *Leaf-blades* lanceolate-acuminate, rounded at the base, flat, flaccid, rather glaucous, up to 7 cm. long, 4 mm. broad, glabrous on both surfaces, scabrid on the margins and on both surfaces, nerves finely prominent ; *sheaths* very much shorter than the internodes, tight or very lax, glabrous, with many fine nerves, glaucous, with markedly glistening hyaline margins, obscurely compressed and keeled, smooth, or if scabrid, very minutely so ; *ligule* a very short, lacerate membrane.

Panicle of 3–7 long, filiform, alternate branches on an angled, glabrous striate axis, erect upon a long-exserted peduncle ; branches smooth, glabrous, up to 8 cm. long, each bearing racemosely arranged, spaced spikelets. *Spikelets* ovate in outline, seated upon slender pedicels 1–3 mm. long, 10–14-flowered, 6–6.5 mm. long, 3–4 mm. broad, slightly compressed. *Lower glume* 3 mm. long, 1.2 mm. broad when flattened, lanceolate-acute, 1-nerved, herbaceous, smooth and glabrous, straight on the back, compressed ; *upper glume* 3.5 mm. long, 1.5–1.75 mm. broad when flattened, herbaceous, 3-nerved with the nerves produced at the apex into a short mucro, smooth and glabrous, straight on the back. *Lemma* about 3 mm. long, 2 mm. broad when flattened, 3-nerved, with the lateral pair near the margins, herbaceous in texture with green nerves, smooth and glabrous on the dorsal surface, keeled in the upper half, obscurely keeled or rounded on the back in the lower third ; *palea* as long as the lemma, oblong in shape with 2-green nerves in the keels, smooth and glabrous on the keels ; *stamens* 3 ; *anthers* 2 mm. long ; *styles* two ; *stigmas* plumose ; grain (young) elliptic in outline, 1 mm. long, 0.75 mm. wide, concave on the adaxial surface, convex on the abaxial surface, dark red in colour, coarsely wrinkled on the abaxial surface ; *lodicules* 2, cuneate.

IND. OR. : Beluchistan, coast, *E. Pierce* (typus in Herb. Kew.).

PLANTS OF THE CAMBRIDGE EXPEDITION, 1947-1948 : II.*
A NEW ORDER OF FLOWERING PLANTS FROM THE BRITISH
CAMEROONS.

J. P. M. BREMAN

During the stay of the Cambridge Botanical Expedition at Banga in the S. Bakundu Forest Reserve of the British Cameroons (see Kew Bull. 1950, 211 : 1950) we collected specimens of a tree whose floral structure is so peculiar that it cannot be fitted, without gross outrage, into any of the existing families that I know. I am forced—and cautious taxonomists should not, I feel, lightheartedly take this plunge without being forced—to make it the type of a new family (*Medusandraceae*) and order (*Medusandrales*).

Floristically, relatively undisturbed rain-forest in the British Cameroons differs very greatly, though not altogether, from its analogue west of the Niger in Nigeria, and neither soil nor climate seems entirely responsible. The new order is, so far, only known from the British Cameroons, and though it may occur in Nigeria I do not think it very likely unless perhaps in the Cross R. basin ; it should however certainly be expected to the south, in the French Cameroons or the Gaboon, with which regions the flora of S. Bakundu F.R. seems to have most in common.

The new order occurs rather commonly in high forest, undisturbed or nearly so as far as one can judge, about the Native Administration timber-camp at Banga, and near Bombe, both between Kumba and Victoria. The composition of this forest is exceedingly rich and botanically most exciting ; but until the specimens collected have been thoroughly worked out it is not possible to give an adequate picture. The new order occurs within one minute's walk of a main road, so that it is a real "botanist's locality". It is a tree normally about 9–18 m. high, thus of the middle storey and, in comparison with some of its neighbours, only medium-sized. The bole is fluted and produces numerous epicormic shoots which strongly remind my friend, Mr. R. W. J. Keay, who has seen the tree *in situ*, of cocoa. When we were there, in March, it was conspicuous by its white racemes of flowers drooping copiously from the older twigs. For further details, including those of its slash, see the field notes of the specimens cited on p. 231.

During the elucidation of this interesting plant I have had quite invaluable help from numerous sources. My colleague, Dr. C. R. Metcalfe has examined the anatomy of leaf, stem and wood and has written an account of it. Dr. G. Erdtman of Bromma, Sweden, has very kindly examined the pollen. Dr. E. H. Chenery has investigated its aluminium content. Mr. R. W. J. Keay recently, at my request, kindly revisited the type-locality and collected more material, including an excellent timber-specimen. While I have been investigating *Medusandra*, Mr. Keay found three fruiting specimens of it among unnamed sheets in the Forest Herbarium, Ibadan, one collected in 1947, the other two by Mr. J. Dundas in 1945, and these are the earliest collections of the plant known to me. Through the kindness of the Inspector General of Forests, Nigeria, I have been able to have these specimens on loan. I have at one

*Continued from K.B. 1950, 211–226.

time or another picked the brains of most of my colleagues here and at the British Museum (Natural History) in the hope that they might have an inspiration about its affinity ; the fact that it is now being made a new order shows, I hope, that it is no fault of theirs that inspiration did not descend. I am, however, happy to say how willing they were to search for it. Among them in particular I must mention Dr. W. B. Turrill who was instrumental in sending the pollen to Dr. Erdtman and who has constantly encouraged me to produce this paper ; also Dr. J. Hutchinson, F.R.S., for his great interest and help in considering the affinities of this family. To all these gentlemen I can only say, with great sincerity, "thank you".

Most of the plants collected by the Cambridge Expedition are represented by several sets, which have been or will be distributed to various herbaria. To save space the following abbreviations will be used :—

K=Royal Botanic Gardens, Kew.

O=Imperial Forestry Institute, University of Oxford.

FHI=Forest Herbarium, Forestry Department, Ibadan, Nigeria.

BM=British Museum (Natural History).

P=Paris.

CA=Cambridge University.

B=Brussels.

LISC=Lisbon (Centro de Botanica).

NY=New York Botanical Garden.

BE=Berlin.

AR=Arnold Arboretum.

Medusandrales *Brenan*, ordo nov.

Arbor mediocris, ubique canalibus secretoriis materies citrinas capientibus percursa. *Folia* alterna, simplicia, obscure crenata vel crenato-serrulata ; stipulae caducissimae, parvae. *Flores* ♂, racemosi, actinomorphi, hypogyni. *Sepala* 5, alabastro aperta libera vel imo basi tantum connata. *Petala* 5, libera, alabastro imbricata. *Stamina* fertilia 5, petalis opposita, inter se libera, petali imo basi plus minusve conjuncta vel saepius libera, staminodiis totidem conspicue elongatis alternantia ; antherae quadri-loculares, lateraliter et longitudinaliter dehiscentes. *Ovarium* superius, syncarpum, uniloculare, columna centrali tenui basi apiceque apta ; ovula apice ovarii circum apicem columnae affixa, 6–8, pendula, anatropa, micropyle superiori. *Styli* 3 (–4), liberi. *Fructus* calyce persistenti accrescenti suffultus, demum capsularis et in valvas 3 (–4) fissus, nonnunquam cohesione valvarum duarum spurie bivalvis. *Semina* pendula, in utroque fructu unica, magna, plus minusve rugosa ; endospermium copiosum, pallidum, paulum ruminatum ; embryo parvus, rectus, prope marginem endospermii unilateraliter infossus.

Familia unica : *Medusandraceae* *Brenan*.

Medusandraceae *Brenan*, fam. nov.

Characteres ut supra, sub ordine. Genus unicum : *Medusandra* *Brenan*.

Medusandra *Brenan* gen. nov.

Characteres ut supra, sub familia. Species unicum : *Medusandra richardsiana* *Brenan*.

Medusandra richardsiana *Brenan*, sp. nov. adhuc unica.

Arbor usque ad 9–18 m. alta ; truncus circumferentia usque ad circiter 1 m., sulcatus, e basi caudiculos numerosos emittens ; cortex atrorubens, pannis griseo-viridibus notatus ; ramuli ultimi juveniles brunneo-purpurei, minute sed satis dense puberuli, serius grisei et lenticellis minimis rotundatis notati. *Folia* petiolata, coriacea vel subcoriacea, elliptica vel oblongo-elliptica, apice breviter et acute acuminata, acumine 0.5–2 cm. longo, basi late et saepe subrectangule cuneata vel leviter rotundata, amplitudine variabilia, apicem ramuli versus (6–) 10 cm. longa, (2.5–) 5–6 cm. lata, inferne plerumque 15–30 cm. longa, 6–14 cm. lata, supra nonnisi primo juventute glabra nitidula, subtus opaca vel vix nitidula, juventute ubique sed praesertim ad costam nervosque appresse puberula matura pilis minimis appressis nisi sub lente valido non cernendis puberula, costa et nervis lateralibus supra prominulis subtus prominentibus, his venis rectis vel subcurvatis subparallelis inter se 3–9 mm. conjunctis et inter venas rete venularum omnibus supra inconspicuis subtus prominulis ; petiolus 3–9 cm. longus, subteres, puberulus, basi apiceque pulvinato-incrassatus, stipulae subulatae, 5–7 mm. longae, puberulae, caducissimae, cicatrices parvas relinquentes. *Inflorescentiae* copiosae, albae, racemosae, densiflorae, amentiformes, pendulae, 3–15 cm. longae, circiter 4–8 mm. diametro, ex axillis foliorum persistentium vel delapsorum solitariae vel binae exorientes ; axis siccitate dense brunneo-puberulus ; pedicelli 1–2 mm. longi, ut axis induti ; bractae minimae, mox caducae, subrhombicae, 1.3 mm. longae et latae, subacutae. *Sepala* ovata vel oblongo-ovata, 1 mm. longa, basi 0.8–1 mm. lata, subacuta, utrumque more pedicelli induti. *Petala* sub anthesin suberecta, glaberrima, viridia, elliptica vel breviter oblongo-elliptica vena unica media percursa, 2 mm. longa, 1.4–1.5 mm. lata, basi rotundata, non unguiculata, apice obtuso et parum eroso saepe leviter recurva. *Antherae* circiter 0.6 mm. longae, 0.6–0.8 mm. latae, dorsifixae, loculis adaxialibus quam abaxiales minoribus ; filamenta 1 mm. longa, glabra, alabastro et saepe anthesi basi petali conjuncta ; nonnunquam stamen unum in flore filamento usque fere ad apicem cum petalo connato. *Staminodia* circiter 7.5–8 mm. longa, flexuosa, cylindrica, basi per 0.5–1 mm. glabra, cetera densissime ac brevissime patentim pubescentia, apice in corpusculum minutum glabrum quadratum obtuse quadrilobatum desinentia. *Ovarium* depresso globosum, brevissime puberulum, circiter 1 mm. latum, 0.6 mm. altum. *Styli* minuti, 0.15 mm. longi, filiformi, glabri, basi erecti tunc extrorsus curvati ; stigmata minutissima. *Calycis fructiferi* lobi rigidi, reflexi, virides, oblongi vel oblongo-elliptici, usque ad 6–8 mm. longi et 3.5–6.5 mm. lati, obtusi. *Fructus* ipse subglobosus vel paulum latior quam longus, apice umbonatus, 1.3–1.5 cm. longus, 1.4–1.7 cm. latus, extra primo puberulus tunc glabrescens, primo viridis tunc albus, demum in valvas fissus et tunc extra brunneus et nitidus intus longitudinaliter sericeo-fibrosus ; pericarpium tenue, demum rigidum. *Semina* magna, pulvini rotundati figura, 8–15 mm. diametro, 5–10 mm. crassa, atrobrunnea plus minusve rugosa, saepe costis 6 crassis irregularibus radiatis superne notata ; testa mediocriter tenuis.

BRITISH CAMEROONS. Kumba Division. On Buea–Kumba motor road, 13 June 1945, *J. Dundas* FHI. 8360 (FHI, fruits) :—on edge of



FIG. 1. *Medusandra richardsiana* Brenan. A. Flowering shoot, $\times 1/3$. B. Part of lower side of leaf, $\times 2$. C. Part of lower side of leaf, showing hairs, $\times 9$. D. Stipule and bud, $\times 2$. E. Part of inflorescence, $\times 2$. F. Fruit before dehiscence, $\times 1\frac{1}{2}$. G. Fruit dehiscent, $\times 1\frac{1}{2}$. H. Seed preserved in spirit, $\times 2$. I. Transverse section of H, diagrammatic; embryo black, endosperm white, cavity in endosperm with cross-lines, $\times 2$. J. Seed, dried, $\times 2$.

A-C drawn from Brenan 9402. D-E drawn from FHI. 28682. F-J drawn from FHI. 29305.

high forest ; tree 90 cm. in girth at 135 cm. height, 12 m. tall ; bark smooth ; slash brown with small amount of pale yellow watery latex ; leaves alternate, acuminate, cuneate at base ; inflorescences axillary ; few flowers ripening into fruits, which are pedicellate, flattened-subglobose, 3-lobed, pale yellow, 1.8 cm. across, with 5 persistent sepals. On branch motor road to Bombe, 16 Nov. 1945, *J. Dundas* FHI. 8485 (FHI, fruits) :—old secondary forest ; tree 150 cm. in girth at 135 cm. height, 10.5 m. tall ; no buttresses ; bark smooth, patched green-brown and grey with fine horizontal ridges of fused lenticels ; slash pinkish, brittle, close-grained ; sapwood white ; fruit 3-valved, brittle, brown ; parrots and baboons eat the fruit. Near Forest Assistant's House, Sawyer's Camp, Banga, S. Bakundu Forest Reserve, 16 July 1947, *M. C. Ejiofor* FHI. 15264 (FHI, fruits) :—in closed high forest ; tree 16.8 m. high, 90 cm. in girth at 135 cm. height ; bole fluted, grey with brown patches ; slash hard and light pinkish-brown, with little and slow exudation of thin brown latex inside the sapwood ; fruits white in colour, brown when dry, picked on the ground ; old leaves green but new ones pinkish-red. S. Bakundu F.R., near Banga, 13 Mar. 1948, *Brenan* 9402 (typus in Herb. Kew., FHI, P, B, CO ; flowers also in spirit) :—in high forest, frequent ; small tree about 9 m. high ; twigs brown ; leaves coriaceous or subcoriaceous, deep green and rather glossy above, midrib and lateral nerves impressed, paler green beneath ; flowers white, in copious pendulous racemes arising from the twigs ; fruiting calyces green. S. Bakundu F.R. near Banga, 18 Mar. 1948, *C. Onochie* 9486 (K, FHI, O, P, BM, B, CA, CO, NY, BE ; flowers and young fruits) :—in high forest, common ; same as 9402 ; tree 15–18 m. high, about 1 m. in girth at breast-height ; bole fluted, with numerous shoots from base, about 3 m. to first branch, smooth, with numerous shallow vertical cracks scaling off in thin irregular woody scales, dark red with grey-green patches ; slash : outer bark dark red, 0.5 mm. thick, brittle ; inner bark reddish-brown, 2 mm. thick, crumbling ; sapwood hard, pale cream-yellow, oxidising to brown fairly quickly ; inflorescences drooping, white ; fruits white, but calyx remaining green ; oldest fruits hardening and brown. S. Bakundu F.R., just N.W. of Banga Timber Labour Camp on the Kumba-Victoria Road, 19 Jan. 1951, *R. W. J. Keay & T. A. Russell* FHI. 28682 (K, FHI, BE, AR ; flowers and young fruits, also in spirit) :—on margin of high forest ; tree about 16 m. high and 25 cm. diam. ; bole fluted at the base ; bark pustular, brown, blotched with green and grey algal marks ; slash : outer bark brown, inner bark reddish-brown, sapwood yellow-cream ; with numerous epicormic shoots arising from base of stem, and looking much like cacao ; crown rather small ; inflorescences pendulous ; peduncles, pedicels and calyces with dark brown hairs ; petals green ; staminodes white ; young fruits pale green ; wood exuding thin sap when cut. Banga, Sawyer's Camp, behind Forest Guard's house about 200 feet W. of Kumba-Victoria motor road, 3 Apr. 1951, *M. C. Ejiofor* FHI. 29305 (K, flowers and fruits, also fruits in spirit) :—in a cassava farm ; tree up to 9 m. high ; bole fluted, grey ; flowers cream-coloured ; fruits pale green, to brown when mature. Banga, outside the Reserve, 30 May 1951, *J. Olorunfemi* FHI. 30606 (K, fruits) :—in high forest with *Strom-*

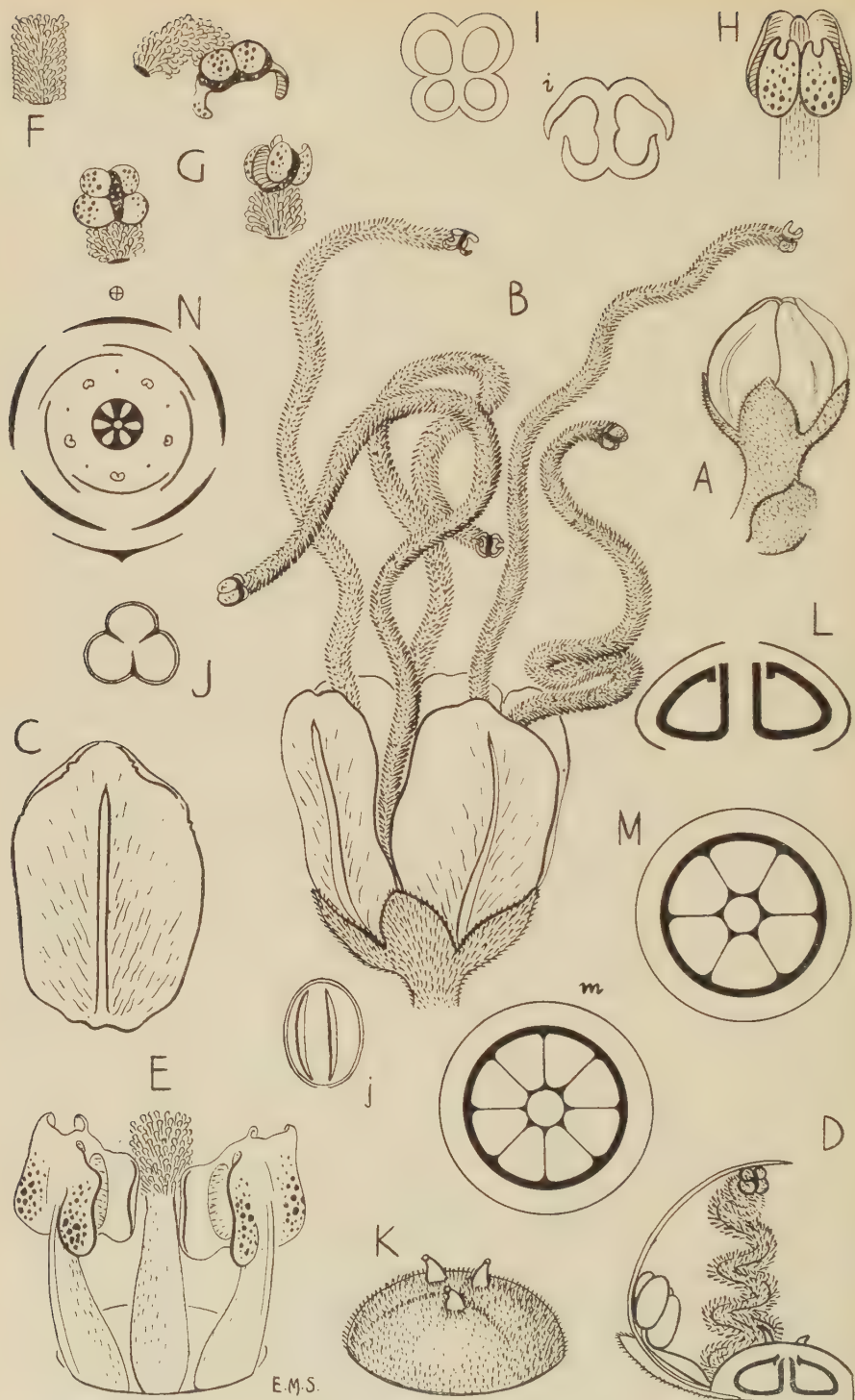


FIG. 2. *Medusandra richardsiana* Brenan. A. Flower bud and bract, $\times 10$. B. Flower, $\times 20$. C. Petal, inner face, $\times 20$. D. Longitudinal section of part of flower bud, $\times 20$. E. Part of androecium, showing two fertile dehiscent anthers and base of staminode, $\times 40$. F. Part of staminode, showing clavate hairs, $\times 40$. G. Three views of anther rudiment at top of staminode, $\times 40$. H. Dehiscent fertile anther, $\times 40$. I, i. Transverse sections of anther before and after dehiscence, $\times 40$. J, j. Polar and equatorial views of acetolysed pollen grains, 9μ and $11 \times 9\mu$ respectively. K. Ovary, $\times 40$. L. Longitudinal section of ovary, diagrammatic, $\times 40$. M, m. Transverse sections of six- and eight-ovuled ovaries, diagrammatic; ovules and central column white, cavity black, $\times 40$. N. Floral diagram.

A drawn from F.H.I. 28682. Remainder drawn from Brenan 9402.

bosia, *Parinari*, *Garcinia*, *Minusops*, etc. ; tree to 13.5 m. high ; bark whitish ; leaves simple, with prominent veins.

Ejiofor 15264 consists of leaves and detached fruiting racemes ; the latter are certainly *Medusandra*, but I feel very uncertain about the leaves which, although rather similar in general appearance, are ovate-oblong and decidedly rounded and slightly emarginate at base. I cannot duplicate this shape in the other gatherings, some of which are very copious, of *Medusandra*, and cannot help suspecting that these leaves may belong to some other species.

The epithet of our plant is given in honour of Prof. P. W. Richards, the leader of the Cambridge Botanical Expedition, through whose labours our visit to the British Cameroons was made possible.

THE POLLEN OF MEDUSANDRA

Dr. G. Erdtman kindly examined the pollen of *Medusandra*, and, *in litt.*, has written the following description :—

Pollen grains radiosymmetrical, 3-colporoidate (occasionally \pm bilateral, 2-colporoidate), usually \pm spheroidal (ranging from suboblate to subprolate or even prolate), $8.8 \times 8.1\mu$ (20 grains measured ; the size figures refer to acetolyzed pollen grains which—partially at least—come from unopened anthers ; average ratio polar axis : equatorial diameter in radiosymmetrical grains 1.04 ; extreme values 0.88 and 1.40). In another slide the size was found to be $11.8 \times 8.9\mu$ (25 grains measured after acetolysis ; these grains are probably more ripe than the grains contained in the first slide). Exine stratification \pm indistinct (sexine probably as thick as nexine or slightly thinner). No visible sexine pattern.

Pollen grains slightly similar to those in Brenan n. 9402 have been found e.g. in the *Oleaceae* (cf. particularly tribe *Couleae*) and will be discussed later on.

THE ANATOMY OF MEDUSANDRA

(See separate paper (p. 237) by Dr. C. R. Metcalfe.

DISCUSSION ON THE CHARACTERS AND AFFINITIES OF MEDUSANDRA

Nobody can reproach *Medusandra* with a lack of unusual features. From the viewpoint of gross morphology, two of them I consider stand out as being especially unusual : firstly the staminodes and secondly the ovary-structure.

In bud the staminodes appear short, squat and suberect, but a closer look shows that the shortness is deceiving : in reality they are closely folded like a firework cracker or a jack-in-the-box. As the flower opens the staminodes unfold and become much longer than the petals ; they retain a curliness about them suggesting wriggling worms, or pipe-cleaners. At the end of each staminode is a minute bluntly 4-lobed body that no doubt represents an aborted anther, and may even partly dehisce. If this is so, then the cylindrical part of the staminode is morphologically equal to a filament ; but then the odd comparison must

be made between the quite glabrous filaments of the fertile stamens and the densely pubescent upper part of the staminodes. The pubescence of the staminodes then, which incidentally is composed of patent clavate hairs obtuse at apex, is something that has come about independently, unless of course the theoretical ancestor of *Medusandra* possessed dimorphic stamens, some with hairy and others with glabrous filaments.

Miss E. M. Stones, to whom I am under a deep debt for her drawings of *Medusandra*, whose excellence needs no emphasis from me, points out that the fertile stamens show interesting differences in their connation. In *Brenan* 9402 the filaments remain attached to the bases of the petals when the latter are removed from the open flower, and often one petal of each flower is connate with the filament to near the latter's apex. In *Keay & Russell* FHI. 28682 all the filaments are free in the open flower, and are left behind when the petals are removed. I do not think that this is more than variation within the species.

The ovary-structure is equally odd. A bald outline was given in the description of the family, but a fuller discussion will I think be useful.

The ovary when first opened appears to be unilocular in a normal way, but when the ovules are shifted, the very remarkable central column is visible. This slender column is attached at base and apex but otherwise free. The ovules are arranged in a ring round the place where the central column is fused with the top of the ovary-wall. Two ovules seem to correspond to each style, so that there are commonly six but sometimes eight ovules.

This is not the place to become involved in a discussion on the origin of free-central placentation, but in the youngest buds that I have examined there are still no septa dividing the young ovary into loculi. In unopened fruits of some size the central column was still there, as a slender thread running through the middle of the ovary from top to bottom.

Bearing these things in mind the question of the affinity of *Medusandra* must now be faced. In general facies it looks Euphorbiaceous, and in fact when I first saw it in the bush I thought that that was its family; this resemblance is strengthened I think by the illusion of the staminodes looking rather like projecting styles. It cannot possibly, however, be put in *Euphorbiaceae* because of the hermaphrodite flowers and the ovary structure.

In facies there is also a vague, remote resemblance to several other rather widely separated families, notably *Anacardiaceae*, *Sapindaceae* (*Allophylus*), *Corynocarpaceae*, *Pandaceae*, *Myrsinaceae* and *Lacistemaceae*. But all these differ very widely and obviously in their floral structure.

I must admit that the morphology has so far not suggested any obvious affinity at all. However, the very remarkable ovary structure can to some extent be paralleled among the families placed by Engler in the order *Santalales*, and by Hutchinson distributed between the *Olacales* and *Santalales*. In the *Santalaceae* the ovary is unilocular and there are 1-5 ovules pendulous from a free-central placenta, whose apex, however, in *Santalum* extends into the stylar canal (cf. Pilger in Engl. & Prantl, Nat. Pflanzenfam., ed. 2, **16b**, 60, 63 (t. 31): 1935). In the *Olacaceae*, *Octoknemaceae* and *Grubbiaceae* the ovary is partly (rarely wholly) septate, the septa often breaking down so that the ovary is then unilocular. The

placentation is normally central, the ovules pendulous from the apex of the placenta, but with the latter normally anatropous with the micropyle pointing upwards and inwards, not upwards and outwards as in *Medusandra*. The placenta is normally free except where the ovary is septate, but in *Octoknemaceae* the central placenta is joined to the apex of the ovary—a condition closely similar to that in *Medusandra*.

Of these three families the *Grubbiaceae* differ widely from *Medusandra* by, *inter alia*, the opposite leaves, valvate sepals, no petals and inferior ovary; the *Octoknemaceae* by the unisexual flowers, valvate sepals, no petals and inferior ovary; the *Olacaceae* by the entire leaves, valvate petals, 2-celled anthers and simple styles. The *Santalaceae* differ in the entire leaves, valvate sepals, isomerous stamens, 2-celled anthers, etc.

On the balance of characters I feel that the *Medusandraceae* are perhaps best placed near the *Olacales* and *Santalales*, particularly with reference to the family *Octoknemaceae*, though the *Medusandraceae* can hardly be referred to either of the two orders mentioned. The seed structure of *Medusandra*, with its abundant slightly ruminant endosperm and small straight embryo, can be paralleled in both *Olacales* and *Santalales*, notably in *Octoknemaceae*.

Finally, we must mention the evidence derived from the anatomy, pollen and aluminium analysis, although I must say that it is no more helpful than the morphology in suggesting a convincing affinity.

The anatomical evidence led Dr. Metcalfe (p. 243) to conclude that *Medusandra* must occupy a somewhat isolated taxonomic position. This is because, so far as he is aware, no exactly similar combination of important diagnostic characters has been recorded in any other plant of which the anatomy is known. He points out that although *Medusandra* has certain distinctive anatomical characters in common with several other families such as *Dipterocarpaceae*, *Lacisternaceae* and *Leitneriaceae*, there is a complete lack of agreement with these same families so far as other characters are concerned. He indicates that these partial agreements are clearly to be interpreted as parallel developments, which have no real taxonomic significance. Dr. Metcalfe concludes his remarks in a more positive strain by indicating that there may be a remote, but definite, affinity between *Medusandra* and the *Icacinaceae*, a view which is more in keeping with my own suggestion that *Medusandra* may be remotely related to the *Olacales*. *Medusandra* is, however, separated from *Icacinaceae* by morphological characters of comparable significance to those that separate it from the *Olacaceae*.

As far as the pollen is concerned, Dr. Erdtman (*in litt.*) writes "the pollen grains in Brenan n. 9402 are unfortunately so small that it is impossible to provide an exhaustive diagnosis. Small grains like these occur, however, in a restricted number of families"; and further, in response to a suggestion of possible affinity with *Olacaceae* and *Octoknemaceae*:

"Your No. 9402 can hardly be related with the following Olacaceous genera: *Anacolosa*, *Cathedra*, *Chaunochiton*, *Harmandia*, *Liriosma*, *Olex*, *Ongokea*, *Ptychopetalum* and *Schoepfia*. The pollen grains in the following genera are of the same size as those in No. 9402 or slightly larger; they are, however, flattened (suboblate or oblate), not subprolate as the grains in No. 9402: *Coula*, *Heisteria*, *Lavalleopsis*, *Minquartia*, *Ochanostachys*, *Octoknema affinis* and *klaineana*, *Strombosia*, *Strombosiopsis*, and *Ximenia*."

I am grateful to my colleague Dr. R. Melville for his help and advice in interpreting the pollen and to Mr. P. Taylor for his care in making preparations.

Dr. Chenery analysed the leaf of *Brenan* 9402 for aluminium-content and found that there were 279 parts per million dry-weight, or .279 per cent. From this it is clear that *Medusandra* is not an aluminium-storing plant (see Kew Bull. 1948, 173 : 1948). While neither the presence nor absence of much aluminium indicates any definite relationship, taken by itself (*l.c.*, pp. 175, *sqq.*), yet Dr. Chenery mentions that *Maesobotrya*, a genus of *Euphorbiaceae* having a slight superficial resemblance to *Medusandra*, and *Octoknema* have 10,000–30,000 parts per million of aluminium, or 1.0–3.0 per cent.

Dr. Chenery also interestingly observes that *Medusandra* has much silica, in this suggestive of *Fagaceae*, *Ulmaceae* or *Moraceae*. It is sad that none of these families is morphologically even a possible candidate for affinity.

If my readers, noting the bewildering and formidable array of families mentioned, have given up in exasperated confusion, I shall at least feel that I have successfully conveyed my own mental state, with little but guesses and uncertainty to impart. And there, for the present, must be left *Medusandra*, enigmatic, isolated, questioning.

Flowering Shrubs and Trees for South African Gardens.*—

Garden lovers in South Africa will find much in this book to stimulate their interest in trees and shrubs and particularly in those which add to the beauty of the garden by reason of their attractive flowers.

Professor R. H. Compton in the preface says the book is "packed full of information and always tells you exactly what you want to know from the grower's point of view." He adds that "it is amazing to find that so many shrubs and trees, coming from very diverse climates, can grow successfully in South Africa." A closer examination of the book reveals the fact that many of the plants described can also be grown successfully in Britain. Indeed it is no exaggeration to say that over 70 per cent. of them can be found growing and thriving well in our gardens to-day. For this reason the book is not without interest in this country. Looking through its pages we meet old favourites such as *Magnolia soulangiana*, *Camellia japonica*, *Prunus serrulata*, *Jasminum primulinum*, *Kerria japonica*, *Forsythia suspensa*, *Buddleia davidii*, *Rhododendron indicum*, and so on, plants which have been for long established in our gardens; the remainder are more familiar as stove or greenhouse plants in this country.

After the introduction the book opens with "A Note on the Names", in which the nomenclature and changes in botanical names are explained. Then follow chapters on climate, soil, propagation and planting, general care, lay-out, ornamental shrubs, ending with individual descriptions of shrubs, trees and climbers arranged in alphabetical order. There are twenty-eight black and white photographs and forty-eight in colour, but unfortunately some of the latter are technically poor. The book is provided with a good index.

H. S. MARSHALL.

*Flowering Shrubs and Trees for South African Gardens. By Sima Eliovson. Cape Town : Howard Timmins. London : George Philip & Son, Ltd. 1951. Pp. xvi, 146. Price 63s.

MEDUSANDRA RICHARDSIANA BRENNAN.**Anatomy of the Leaf, Stem and Wood.**

C. R. METCALFE.

Since *Medusandra richardsiana* is not known to have any very close relatives amongst the modern angiosperms, it was anticipated that the leaf, stem and wood of this species might reveal anatomical features of taxonomic or phylogenetic interest. A careful investigation has given considerable support to this view, for, although all of the characters observed are known to occur in certain other angiosperms, no species, genus or family is known for which the same combination of diagnostic microscopical characters has been recorded. From the phylogenetic standpoint it is noteworthy that the microscopical characters of the wood include many that can be interpreted as primitive or unspecialized in the light of modern views on this subject. The anatomy of the vegetative organs thus fully confirms the view, based on floral and other exomorphic characters, that the species occupies an isolated taxonomic position, and that it should be assigned to a low position in any phylogenetic scheme. Before discussing this subject more fully, an account of the anatomy of the vegetative organs will be given.

LEAF.

Dorsiventral. **Hairs** (Fig. I.A.) confined to the lower surface, each hair unicellular, but sometimes appearing to be bicellular owing to the swollen base being embedded in the epidermis and rather clearly demarcated from the distal end of the hair. Walls of the hairs moderately thick-walled, sclerosed; rather obscure pits noted in the cell walls at the bases of the hairs in sections stained with safranin. Hairs mostly somewhat bent.

Epidermis. Cells of the upper epidermis with very sinuous anticlinal walls. Cells of the lower epidermis mostly with sinuous anticlinal walls except at the bases of the hairs, around which the neighbouring cells are often radiately arranged (Fig. I.A.) and filled with gum-like contents shown in black in the illustration. The contents of these cells dissolve when treated with eau de javelle and similar bleaching and clearing solutions, so that they cannot be seen in epidermal preparations made with the aid of this type of reagent. **Stomata** confined to the lower surface; rather infrequent; anomocytic. **Mesophyll** consisting of one layer of tall palisade cells, and a broader region of spongy tissue. Vascular bundles of the smallest **veins** embedded in the mesophyll and accompanied, chiefly on the adaxial side, by some fibres. Large veins projecting somewhat from the lower surface of the leaf, the vascular bundles being more or less completely sheathed by sclerenchymatous elements.

A secretory canal, which in herbarium specimens contains a lemon-yellow amorphous substance, accompanies every vascular bundle except possibly the smallest, being situated on the abaxial side of the xylem, but between this and the adjacent fibres. Transverse sections through the **midrib** in the proximal third of the leaf (Fig. I.B.) exhibit, towards the abaxial surface, an adaxially flattened cylinder of xylem enclosing a

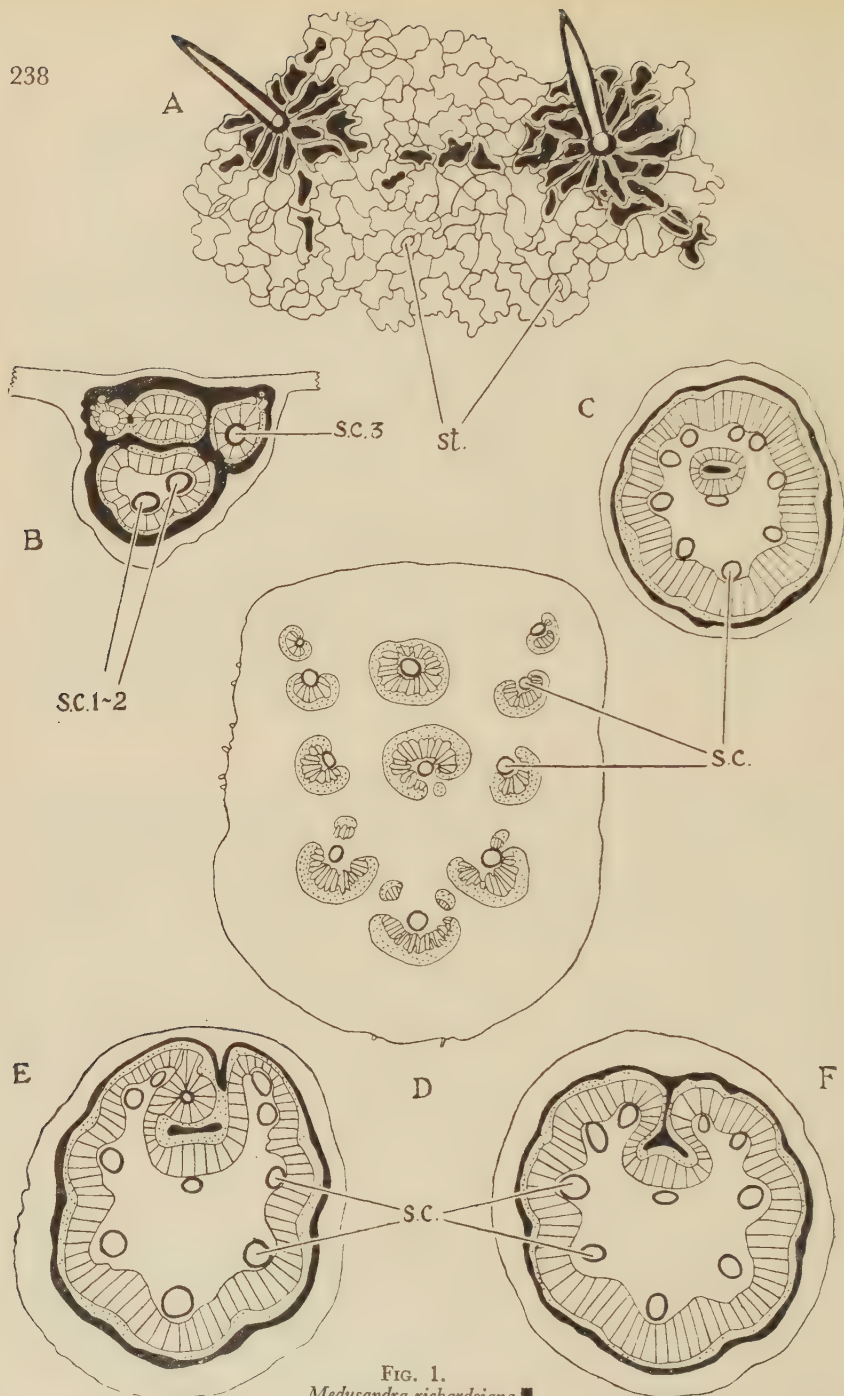


FIG. 1.
Medusandra richardsiana.

- A. Surface view of portion of lower epidermis of leaf $\times 260$, showing 2 thick-walled, unicellular trichomes; anomocytic stomata (st.); epidermal cells with sinuous anticlinal walls. Amorphous chemical deposits shown in black.
- B. T.S. midrib in proximal third of the lamina $\times 18$.
- C. T.S. through the petiole in the middle of its length $\times 18$.
- D. T.S. pulvinus $\times 18$.
- E. T.S. through the petiole at the base of the pulvinus $\times 18$.
- F. T.S. through the petiole near its base $\times 18$.

In B-F the xylem is shown as radiating lines, the phloem as dotted areas, and the sclerenchyma as solid black. The thick-walled circles S.C. represent secretory canals.

triangular area of mostly thin-walled ground-tissue, with 2 secretory canals (S.C. 1-2) embedded in the ground-tissue. The abaxial cylinder of xylem is surrounded by a narrow zone of thin-walled tissue, probably representing the phloem. Three smaller cylinders of xylem, each surrounded by phloem, are also present but towards the adaxial surface of the midrib. A large secretory canal (S.C. 3) is visible in the centre of one of the adaxial vascular cylinders. (No secretory canals could be detected within the other adaxial cylinders in the herbarium material available, owing to disorganization of the thin-walled tissue in this region, but the distribution of secretory canals could be more reliably determined in fresh material, or material preserved in a fluid medium). The whole vascular system is surrounded, and the 4 cylinders of xylem and phloem separated from each other, by sclerenchyma. The vascular structure of the midrib was less complex in transverse sections through the centre of the leaf, the abaxial cylinder of xylem and phloem enclosing only one secretory canal. A single, free, adaxial cylinder was present in this position, but another partly fused with the abaxial cylinder was visible, the third cylinder having passed out into a lateral vein. The vascular system was still further reduced in transverse sections through the midrib just below the pointed apex of the leaf; consisting, in this position, of a single cylinder of xylem and phloem enclosing a solitary secretory canal. Transverse sections of the midrib in these 3 positions indicate that the vascular system becomes less complex as each succeeding lateral vein is given off from the midrib.

Petiole. Transverse sections through the pulvinus (Fig. I.D.) at the apex of the petiole show a deep crescent of 9 widely separated vascular bundles in which the xylem vessels are in very definite radial rows. Two additional vascular strands are present between the ends of the peripheral crescent of vascular bundles, the more abaxial member of the central pair being inversely orientated. All vascular strands crescent-shaped, the xylem being on the concave sides of the strands, and a single, large, conspicuous, secretory canal being partially enclosed in the concavity of the xylem. Ground-tissue of the pulvinus devoid of sclerenchyma, but a broad peripheral zone of collenchyma is present, the inner ground-tissue being parenchymatous and many of the cells filled with mucilage. The whole pulvinus is covered externally by a few layers of cork-like cells with amorphous contents. Transverse sections at the base of the distal pulvinus show a closed, sinuous cylinder of xylem and phloem, the cylinder being strongly invaginated on the adaxial side (Fig. I.E.). The vascular cylinder is surrounded by a layer of sclerenchyma. The vessels of the xylem in this part of the petiole are less crowded, and in less definite radial rows, than those in the xylem of the pulvinus and midrib. Nine secretory canals occur in the "medullary" ground-tissue adjacent to the xylem. An additional canal, also in the "medullary" tissue, abuts on the adaxial, invaginated xylem. Finally there is a canal, completely enclosed by xylem, in an adaxial position. At a lower level, about half way along the length of the petiole, the vascular structure is similar (Fig. I.C.) but the invaginated portion of the xylem is here cut off from the main vascular cylinder and appears as a small, cylindrical, "medullary" strand. There is a circle of 9 secretory canals abutting on the inner margin of the xylem, and also a central canal. The

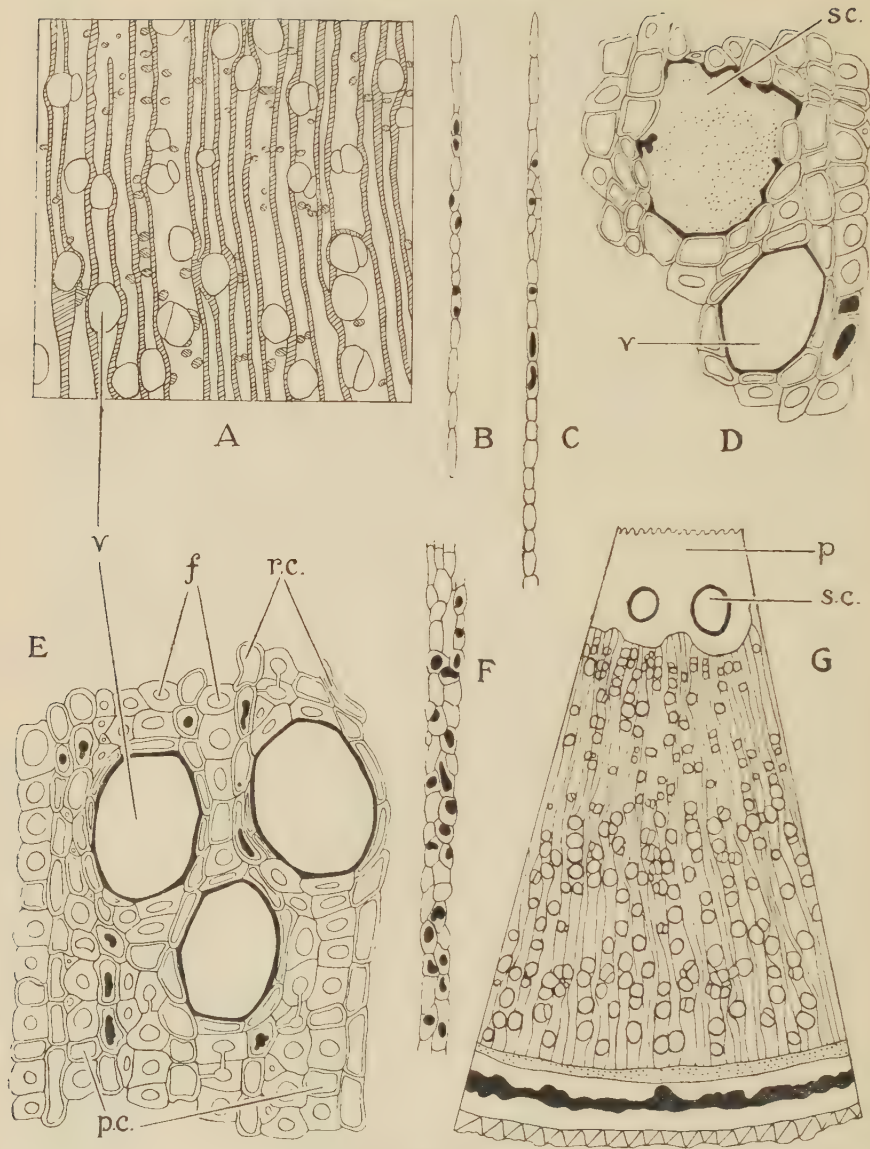


FIG. II.

Medusandra richardsiana.

- A. T.S. wood $\times 50$, showing vessels, rays and parenchyma. The white areas between the rays consist of wood fibres.
- B. Complete uniseriate ray $\times 75$.
- C. Portion of partly biseriate ray $\times 75$.
- D. T.S. wood, showing a vessel (V) (without contents), and a secretory canal (S.C.) filled with amorphous contents, the latter represented by a dotted area, $\times 200$.
- E. T.S. wood, showing 3 vessels (V), fibres (f) with thick walls, and ray—(r.c.), and diffuse-parenchyma (p.c.), with thinner walls $\times 200$.
- F. Portion of a mainly biseriate ray $\times 75$.
- G. T.S. young stem $\times 38$. S.C. Secretory Canals. P. Pith.

In Figs. B–F the amorphous chemical deposits in some of the cells are shown as solid black. In G the cork is shown as an undulating line, the “pericyclic” sclerenchyma in solid black, the phloem as a dotted zone, the xylem vessels as circles and the rays as sinuous lines. The thick-walled circles near the inner boundary of the xylem represent secretory canals.

“medullary” vascular cylinder reunites with the main cylinder of xylem and phloem at the base of the petiole (Fig. I.F.). Abundant cluster crystals present in some parts of the phloem, and a few in the petiolar ground-tissue.

STEM (Fig. II.G.).

The following description applies to a stem 0.5 cm. in diameter, taken from a herbarium specimen. **Cork** consisting of 6–10 layers of flattened thin-walled cells, with yellowish deposits in some of the cells. **Cortex** composed, for the most part, of about 8 layers of tangentially compressed parenchymatous cells, but with some stone cells, and somewhat elongated sclerosed cells, embedded in it. **Pericycle** bounded externally by a broad, continuous zone of sclerenchyma consisting of groups of very thick-walled fibres separated from one another by stone cells. **Phloem** in the form of a narrow, continuous zone, traversed by the distal ends of the rays. **Xylem** constituting a large part of the total diameter of the stem. Vessels mostly solitary, but tangential or oblique pairs fairly numerous. Vessels of the first-formed (presumably primary) wood tending to be in radial multiples. Pitting in the lateral walls of the vessels mostly scalariform, but locally tending to be opposite. Scalariform pits provided with wide borders. Perforation plates exclusively scalariform, commonly with about twenty, and sometimes with as many as fifty or more, very fine bars. Vessels 10–60 (mostly about 38) μ in radial diameter. Vessel members 0.475–1.695 (mostly about 1.14) mm. long. Rays uniseriate; more or less homogeneous, composed wholly of upright cells, but individual cells varying somewhat in height; very tall, the number of cells in a single ray being difficult to count, but examples of rays as much as 88 cells tall were noted. Fibres constituting most of the ground-tissue of the wood; arranged in very definite radial rows as seen in transverse sections; thick-walled and somewhat angular in outline; lumina variable in width, being much narrower towards the ends than in the middle of each of the individual fibre elements. Pits infrequent except near the ends of the elements, conspicuously bordered and provided with vertical or oblique, slit-shaped apertures. Parenchyma very sparse, mostly as scanty paratracheal, and a little diffuse. **Pith** homogeneous, consisting of moderately thin-walled, pitted parenchyma, the cells appearing more or less circular in transverse sections, but longitudinal sections show them to be slightly elongated axially. **Secretory canals**, sometimes with lemon coloured, amorphous contents, constitute a conspicuous and important diagnostic feature of the stem, where they occur at the outer periphery of the pith.

WOOD* (Fig. II. A–F).

Vessels of small to medium size, the radial diameter being 30–125 (mostly 75–120) μ , many of them approximately oval, but frequently having a characteristic appearance owing to the adaxial and abaxial portions of the walls being flattened; mostly solitary, but some in radial, oblique, or tangential pairs; occasional multiples of up to 8 vessels noted. Vessel pattern locally tending to be oblique. Vessels fairly evenly distributed, but relatively infrequent at the boundaries between the very irregular growth zones, smaller and more frequent

*Description based on a Forester's hand sample.

near the pith than in the later-formed wood ; 11–43 (mostly 19–24) per sq. mm. Perforations very oblique, scalariform, with up to 40 or more very fine bars. Pitting in the lateral walls of each vessel confined to certain areas, the pits usually horizontally elongated and scalariform to opposite, but a few oval or circular in shape. Vessel members 1.6–2.6 mm. long, these measurements being taken from the extremities of the long ‘ tails ’ at either end of each member.

Parenchyma. (For definition of descriptive terms see Metcalfe and Chalk (1950). Scanty paratracheal and diffuse, the latter being scattered. Diffuse parenchyma much more abundant in some portions of the wood than in others ; distinguishable, in transverse sections, from the adjacent fibres by having thinner walls and, many of them, like the ray cells, by being partly filled with dark-coloured amorphous deposits. Diffuse parenchyma visible in tangential sections as slightly elongated, rectangular cells with pits in the end-, and sometimes in the lateral-walls, the cells being arranged in vertical files. Ends of some of the files of parenchyma cells abutting on fibre-tracheids, and others on ray cells. Terminal cells of certain of the parenchyma files pointed. Diffuse parenchyma cells more easily recognisable in radial sections where they are less easily confused with ray cells ; appearing as well defined axial files of up to 20 or more cells. The terminal cells at either end of each column of parenchyma frequently appear to abut on ray cells, so that the parenchyma columns serve to connect the rays with each other. Diffuse parenchyma increasingly abundant towards the pith, where some of the files are more than one cell wide as seen in radial sections.

Rays 15–20 per mm., deviating around the vessels, nearly all of which are bounded on either side by a ray. Rays mostly uniseriate (Fig. II.B), but some of them partly biseriate for short (Fig. II.C.), and occasionally for long (Fig. II.F.), portions of their lengths ; 8–85 or more cells high, but mostly falling into 3 categories, each of which is about 25, 50 or 75 cells high. Heights ranging from 0.8–4.1 mm. or more, and commonly in 3 categories measuring about 1.2, 2.4 and 3.6 mm. respectively. Rays heterogeneous, the component cells mostly appearing square to markedly upright in radial sections, truly procumbent cells being absent or rare.

Fibres in well defined radial rows, except for interruptions by diffuse parenchyma cells. Fibres square to polygonal in outline in transverse sections, but each with a thick wall and a circular to elliptical lumen ; locally, especially at the boundaries of growth zones, tangentially flattened. Wood consisting almost wholly of fibres, with an admixture of only a small amount of parenchyma, in sporadic growth zones where vessels are sparse or almost absent. Certain portions of the wall of each fibre are provided with short uniseriate, or occasional biseriate, rows of pits with vertical to slightly oblique slit-shaped apertures ; pits bordered, the borders of some pits being very conspicuous and those of others less so. Ends of the fibres tapered, the walls of some of the tapering ends having local external projections of thickening. Vertical **secretory canals** (Fig. II.D.) with pale yellow, amorphous contents in the lumina, occur sporadically throughout the wood. Some of the canals are slightly wider than, but others of about the same diameter as, the vessels.

TAXONOMIC AND PHYLOGENETIC NOTES.

The most striking diagnostic characters of *Medusandra richardsiana* include the distinctive, bent, sclerosed hairs on the lower surface of the leaf, with pits in the thickened cell walls at the bases of the hairs ; the complex vascular structure of the petiole, distal pulvinus and midrib ; the long elements of the secondary xylem, which include vessels with scalariform lateral pitting, and many-barred scalariform perforation plates in the end walls of the vessel members ; the tall, uniseriate rays, wholly composed of square or upright cells ; the wood fibres with bordered pits ; the secretory canals, with lemon-yellow contents, in the pith of the stem, and which accompany the vascular system of the petiole and midrib, extending, beside the vascular bundles of the veins, into the mesophyll. Similar canals also occur sporadically in the wood. It might be expected that it would be comparatively easy to establish the taxonomic affinities of a plant with so many distinctive anatomical characters. This is not so, however, because a similar combination of characters does not appear to have been recorded in any other flowering plant. Thus, for example, relatively few plants, belonging to only a few families, are known to possess secretory canals similar to those of *Medusandra richardsiana*. This species can, however, be excluded from all of the families in which secretory canals are known to occur, on other grounds.

Petioles with a complex vascular structure are relatively infrequent amongst the Dicotyledons, but, where a complex structure is known to occur, secretory canals are seldom to be found in the same plant. A notable exception is provided by the Dipterocarpaceae, in which a complex petiole structure and secretory canals occur together. Scalariform perforation plates and scalariform lateral pitting are, however, unknown amongst the Dipterocarpaceae, so that, on anatomical grounds alone, there seems little likelihood that *M. richardsiana* is allied to the Dipterocarpaceae. The hairs and petiole structure in *M. richardsiana* somewhat recall those of the Lacistemaceae, but secretory canals are unknown in this last family, and, moreover, the type of pitting in the vessel walls is very different. The Leitneriaceae and *M. richardsiana* agree in having similar secretory canals, but there is no marked similarity in other respects. The specimen can likewise be shown to resemble members of various other families in one respect or another, but no very comprehensive agreement with any one of them has yet been found to exist.

The vessel members in the mature wood are, as already stated, 1.6–2.6 mm. long. This length is well above the average for the Dicotyledons as a whole, as is clearly shown by reference to the information recorded by Metcalfe and Chalk (1950). Indeed the figures are amongst the highest that have been recorded. Reference to the long lists of the lengths of vessel members in different species published by Bailey and Tupper (1918) shows that lengths comparable with those in *M. richardsiana* have been recorded in species of *Altingia* and *Bucklandia* (Hamamelidaceae), *Saurauia* (Saurauiaceae), *Turpinia* (Staphyleaceae) and *Villaresia* (*Citronella*) (Icacinaceae). The occurrence of long vessel members in these genera does not imply that they are all closely allied to one another, but signifies that the genera are primitive or unspecialized in their wood structure. It is, however, amongst the genera in which unspecialized

wood characters have been retained, that the affinities of *M. richardsiana* might be expected to lie. It does not seem probable that the relationship to any of the genera just mentioned can be very close, since they all differ from *M. richardsiana* in one important anatomical respect or another, and there are also notable floral and other exomorphic distinctions. On the whole, of the families concerned, it seems just possible that *M. richardsiana* might be remotely related to the Icacinaceae. *Cardiopteris* and *Trematosperma* are the only genera of Icacinaceae in which secretory canals are known to occur.

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Bacterial Plant Pathogens.*—Plant pathologists throughout the world should welcome this new and completely rewritten edition of Miss Elliott's useful compendium. In place of 183 plant pathogenic species and varieties of Bacteria recognised in the 1930 edition we now have 192, or 188 if the formae speciales of *Xanthomonas translucens* be ignored. No less than 81 of these have been described since the appearance of the first edition so the drastic relegation to synonymy and elimination of doubtful pathogens which has taken place in the last 20 years is at once apparent. 48 species previously listed as plant pathogens are now rejected as such, including *Bacterium rubefaciens* Burr. and the notorious *Bacillus lathyri* Manns & Taubenhaus. The increased synonymy may be illustrated by the rise in that of *Pseudomonas syringae* Van Hall from 2 to 13 epithets, including *Pseudomonas prunicola* Wormald and that of *Erwinia carotovora* (Jones) Holland from 3 to 12, including *Bacillus phytophthorus* Appel. The increased stability of bacterial nomenclature is illustrated by the reduction in the number of new combinations deemed necessary in this edition to 2 as against 29 in the first edition. Evidently bacterial genera are beginning to mean something definite and generally acceptable among bacteriologists. Comparison with Dowson† (1949) confirms this gratifying conclusion, the only difference in generic treatment being the recognition by Elliott of the small genera *Agrobacterium* Conn, Wolf and Ford (4 species) and *Erwinia* Winslow et al. (21 species) for some of the Bacteria included by Dowson in *Bacterium* Ehrenberg. R. W. G. DENNIS.

*Manual of Bacterial Plant Pathogens, second, entirely revised edition, (Annales Cryptogamici et Phytopathologici Vol. 10) pp. xii + 186, 1951. Price \$6.00. Waltham, Mass. The Chronica Co. ; London : Wm. Dowson & Sons Ltd.

†Dowson, W. J., 1949. *Manual of Bacterial Plant Diseases*. London.

A SECOND SPECIES OF THE GENUS HEPTACODIUM REHD.

(CAPRIFOLIACEAE).

H. K. AIRY SHAW.

For many years there have lain in the Kew Herbarium two sheets of an undetermined Chinese shrub with opposite trinerved leaves and a terminal thyrses of superficially jasmine-like flowers. One sheet was indeed written up "*Jasminum*"; the other bore the legend "*Apocynaceae*". The latter suggestion was manifestly quite erroneous, but the *Jasminum* determination looked at first sight plausible. Closer inspection, however, revealed the fact that the apparent corollas were in fact accrescent fruiting calyces, and that the flowers were arranged in small dense whorls of six, surrounded at the base by an involucre of closely imbricating bracts. Having previously taken some interest in the *Caprifoliaceae*, the writer recalled a rare shrub collected by Wilson in Hupeh and described by Rehder in Sargent, *Pl. Wils.* 2, 617-619: 1916) as *Heptacodium miconioides* Rehd., and reference to the isotype preserved at Kew showed that this was clearly the correct generic disposition of the mysterious specimens.

This discovery is of some interest, since the original species was noted by Wilson as being very rare, and as far as I am aware has not been collected since. The genus, moreover, as Rehder remarks, does not suggest *Caprifoliaceae* in general appearance, but rather recalls *Jasminum*.

A description of the new species follows. It is unfortunate that all the corollas have fallen, the plant having been collected at the young fruiting stage, but the material is otherwise so ample, and the species so distinct, that description seems justified in the circumstances.

Heptacodium jasminoides Airy Shaw, sp. nov., ab *H. miconioides* Rehd. foliis multo longioribus oblongo-ovatis, inflorescentia laxa elongata, capitulis geminatim 'superpositis' superiore ex inferiore exorto, bracteis capituli inferioris cujusque paris glabris vel parcissime pubescentibus (nec dense sericeis), bracteis infra-capitulinis prope basin nec prope apicem pedunculi sitis, valde distinctum.

Frutex (?), statura ignota, ramulis gracilibus elongatis tetragonis 2-3 mm. diametro glabris rubidis vel pallide brunneis. *Folia* oblongo-ovata (raro subovata), 9-13.5 cm. longa, 3.5-5 cm. lata, basi rotundata (vel levissime cordatula), apice acutata et longe acuminato-caudata, acumine gracili 1-2.5 cm. longo 2-3 mm. lato acuto, margine integro interdum levissime undulato, textura tenuiter chartacea, supra glaberrima, subtus secus nervos longiuscule pilosa ceterum glabra, subtus subobscura dense minutissime glanduloso(?) punctata, siccitate supra fusco-brunnea subtus pallidiora; costa gracilis, cum nervis 2 primariis basalibus costae fere parallelis speciem velut costae triplicis praebens, his 'costis' 5-8 mm. inter se distantibus in ipsum apicem percurrentibus subtus prominentibus supra leviter vel vix impressis; nervi laterales gracillimi, e costis irregulariter orti, marginem versus procurvi; petiolus 1 cm. longus, 1-1.5 mm. diametro, supra canaliculatus, subtus subcarinatus, parce pubescens. *Gemmae axillares* parvae, ovoideae, 2-3.5 mm. longae, perulis glabris exterioribus brevibus obtusis interioribus longioribus acutiusculis. *Inflorescentia* thyrsioidea, terminalis, subpyramidalis, 8-13 cm. longa, 5-8 cm. lata, internodiis 2 vel 3; ramuli

oppositi, rigidi, patuli, tetragoni, glabri, infimi 2·5–4 cm. longi foliis normalibus suffulti, supremi circiter 1·5 cm. longi, bracteis foliaceis usque 5 cm. longis vel parvis subspatulatis acutis usque 9 mm. longis suffulti, omnes apice ‘capitula’ (verticilla 6-flora valde compacta, superposite geminata 6 (3×2) vel 10 (5×2) gerentes. *Capitula geminata* pedunculata: capituli terminalis pedunculus brevis, 2–4 mm. longus; capitulorum lateralium pedunculi 6–10 mm. longi, angulo recto patentem, basi bractea parva ovato-lanceolata carinata acuta 2–5 mm. longa pedunculo adpressa suffulti, apicem versus bracteas similes 2 oppositas gerentes. *Capitulum inferius* cujusque paris 5 mm. longum et latum; bracteolae exteriores ovato-orbiculares, 3–4 mm. diametro, ciliolatae, ceterum glabrae, interiores angustiores. *Capitulum superius* e medio inferioris exortum, circiter 6 mm. pedunculatum, 4 mm. longum et latum; bracteolae exteriores iis capituli inferioris similes, sed paullo minores et dorso brevissime sericeae. *Flores* (corollis deficientibus), 4 mm. longi, subsessiles, calycibus omnino in bracteolis ‘capituli’ occlusis. *Calycis* tubus 2 mm. longus, longe dense setoso-pubescentem; segmenta oblonga, 2 mm. longa, 0·5 mm. lata, obtusiuscula, margine sericeo-ciliata. *Corolla*, *stamina* et *stylus* ignota. *Fructus* immaturus tantum notus, anguste obconicus, 11 mm. longus, apice usque 3 mm. crassus, obscure 10-costulatus, parce longe setoso-sericeus vel glabrescens, calycis segmentis persistentibus erectis subspatulatis 11–12 mm. longis 3–4 mm. latis subacutis membranaceis nervosis parce puberulis vel glabrescentibus. *Semen* (immaturum) solitarium, subcylindricum, 5–6 mm. longum.

CHINA. Chekiang: Ningpo, Wating Shan, dripping rocks at 900 m., 13 Sept. 1877, *W. Hancock* 22 & 98 (typus, Herb. Kew).

As noted in the diagnosis, the present species differs from *H. miconioides* Rehd. in the much longer, oblong-ovate, more gradually acuminate leaves, the larger, laxer inflorescence, the remarkable arrangement of the flowers in *paired, superposed* verticils, and in the glabrous bracteoles of the lower whorl. The habitats of the two species appear to be similar, since *H. miconioides* was growing on cliffs at 900 m. at Hsing-shan Hsien in W. Hupeh, situated over 600 miles almost due west of Ningpo. Rehder has pointed out the similarity of the corolla of *H. miconioides* to that of *Lonicera*, and of the fruit with its accrescent persistent calyx to that of *Abelia*. He has also compared the inflorescence of *Heptacodium* to that of *Lonicera* section *Periclymenum*, and this comparison is supported by the discovery of the present species with *two* 6-flowered whorls of flowers. The same arrangement of tiered 6-flowered whorls is found in 4 of the 6 known species of *Leycesteria*, and the leaves of *Heptacodium*,—apart from their trinerved condition, which is unique in the *Caprifoliaceae*—resemble those of *Leycesteria formosa* Wall. quite closely.

The jasmine-like appearance of the new species is brought about mainly by the combination of the trinerved leaves and the thyrsoid inflorescence. The resemblance is enhanced, at least in the dried state, by the curious superficial similarity of the accrescent fruiting calyces to the corollas of *Jasminum*.

It is possibly this species that is listed from Chekiang, as *H. miconioides* Rehd., without further comment, by K. S. Hao (‘Hopkinson’) in *Contrib. Lab. Bot. Nat. Acad. Peiping*, **1**, 74 (1931).

NOTES ON THE ANATOMY OF HEPTACODIUM.

C. R. METCALFE.

The anatomical structure of the leaf and stem of *Heptacodium jasminoides* Airy Shaw, represented by *Hancock* 22 and 98, was examined, and comparisons made with *Heptacodium miconioides* Rehd., as represented by the type specimen, *Wilson* 2232. This investigation has shown that the structure of Hancock's two specimens is almost identical, and that it differs from that of *H. miconioides* only in minor respects. Furthermore, all three specimens exhibit a number of characters that are consistent with the inclusion of the genus amongst the *Caprifoliaceae*. The more significant anatomical characters of the two specimens collected by Hancock are given in the following description.

HEPTACODIUM JASMINOIDES Airy Shaw.

LEAF.

Solitary, shortly-stalked, peltate, **glandular hairs** with multicellular heads present in shallow pits on both surfaces of the lamina, but much more frequent on the abaxial than on the adaxial side. **Epidermis**, on both surfaces, composed of mostly pentagonal and hexagonal cells, with moderately thick anticlinal walls, and a conspicuously striated cuticle. **Stomata** confined to the lower surface; mostly anomocytic, but some tending to be paracytic. **Mesophyll** dorsiventral, including 2 or 3 layers of tall palisade cells. **Petiole**, in transverse sections through the distal end, very distinctive in appearance owing to its consisting of an abaxially keeled median portion, which is clearly demarcated from 2 large wings with conspicuous constrictions where they are attached to the median portion of the petiole. A large arc of xylem and phloem is present in the median part of the petiole and a similar vascular strand in each of the wings.

STEM. (Description based on stems about 3 mm. in diameter).

Cork apparently originating in the inner part of the cortex; consisting of 3-4 layers of thin-walled, rectangular cells. **Pericycle** bounded externally by a continuous ring of sclerenchyma composed partly of stone-cells and partly of fibres; large crystals present in some of the stone-cells. **Phloem** devoid of lignified tissue. Primary **xylem** including radial multiples of up to about 7 vessels. Vessels of the secondary xylem mostly solitary and somewhat angular in outline; radial and oblique pairs also occur but less frequently. Vessels of the secondary xylem mostly 24-28, but sometimes up to as much as 32, microns in radial diameter. Vessels of the primary xylem slightly wider. Vessels of the secondary xylem with opposite to scalariform lateral pitting; end walls always very oblique, some with simple perforations, and others with scalariform perforation plates with up to about 12 moderately coarse bars. Slender tertiary spiral thickenings common in many of the vessels. Rays mostly uniseriate, but sometimes partly biseriate; heterogeneous, composed of a mixture of a few square and more numerous upright cells. Individual rays tall, some apparently as much as 50 cells high, but this may be partly due to fusions between rays. Ground-tissue of the xylem composed of thick-walled **fibres**, many of which, in glycerine mounts, exhibit pits

with conspicuous borders and oblique, slit-shaped apertures. **Pith** wide, parenchymatous, lignified ; the component cells of the peripheral layers having thicker, more conspicuously pitted walls than the central cells.

HEPTACODIUM MICONIOIDES Rehd.

This species agreed with the description given above in all essentials. This applied particularly to the stem. The material available was so young that cork had not yet been formed, and the pith cells were more uniformly thickened than in *H. jasminoïdes*. Other differences from *H. jasminoïdes* were as follows. Transverse sections of the petiole of *H. miconioïdes* showed the same distinctive type of structure, but the constrictions between the wings and the median part of the petiole were less pronounced. In *H. miconioïdes* the mesophyll included only 1-2 layers of palisade cells, and the individual cells were not quite so tall. The anticlinal walls of the epidermal cells on both surfaces were more sinuous, and the striation of the cuticle less conspicuous. Peltate glands were much less frequent than in *H. jasminoïdes*. These differences are of the type whereby species of a single genus may generally be distinguished from each other.

EVIDENCE OF AFFINITY WITH THE CAPRIFOLIACEAE.

It has already been pointed out that the structure of *Heptacodium* is consistent with its being included in the *Caprifoliaceae*. The more important characters which indicate that this is the correct taxonomic position for the genus are the following. The predominantly anomocytic stomata with an admixture of a few that tend to be paracytic. The cork which arises in a deep-seated position in the stem, and consists of thin-walled rectangular cells with wide lumina. In the xylem, the mainly solitary vessels with a mixture of simple perforations and scalariform perforation plates in their end walls ; the wood fibres with conspicuously bordered pits. Opposite or scalariform lateral pitting to the vessels is uncommon in other members of the *Caprifoliaceae*, but they are known to occur in *Leycesteria* and *Symphoricarpos*. Predominantly uniseriate rays composed of square to upright cells are also of restricted occurrence amongst the *Caprifoliaceae*, but it may well be that the broader rays that occur more commonly in the family are to be found chiefly in wood from thicker stems than those in the herbarium specimens of *Heptacodium* which were available for examination. *Heptacodium* also differs from most members of the *Caprifoliaceae* that have been examined in having 2 or more layers of palisade cells in the mesophyll of the leaf, whereas only a single layer occurs in members of the family that have previously been examined. This last difference is probably not important, however, as the number of palisade layers is known to vary to some extent with the ecological conditions in which the plant grows, and a considerable range of variation frequently occurs within a family.

CONTRIBUTIONS TO THE FLORA OF TROPICAL AMERICA : LIII.*

A SOUTH AMERICAN SPECIES OF SYMPLOCOCARPON.

N. Y. SANDWITH and C. E. KOBUSKI.

In 1941 Kobuski gave a review of Airy Shaw's new genus *Symplococarpou* and raised the number of known species from one to six, found in Mexico (3 species, in the States of Mexico and Chiapas), Costa Rica (2 species) and Panama (1 species, in the Boquete District, Chiriqui Province). Since then Lundell (1942) has described two further species, one from Mexico (State of Chiapas), known only from fruiting material, the other from the Stann Creek District of British Honduras. Both these species were regarded by their author as allied to *S. multiflorum* Kobuski, of Costa Rica, which has the apex of the ovary hirsute, glabrous styles, and the filaments noticeably thickened at the base.

Last year, when examining some covers of undetermined South American *Myrtaceae* in the Kew Herbarium, Sandwith discovered 4 sheets of a *Symplococarpou* collected by F. C. Lehmann on the highlands of Popayán, in Southern Colombia, as long ago as 1885-1889. The collector noted that his specimens came from a small tree occurring rarely in dense forests on the Rio Huangubío, at 1700-1800 m. This locality lies between the Cordillera Central and the Cordillera Occidental of the Andes. Popayán is at least 700 miles distant, by land, from the next nearest known locality of a species of *Symplococarpou*, viz. *S. chiriquiense* Kobuski, of Panama. The genus is thus recorded for the first time from South America.

Discussion between the two present writers has led to the decision to recognize the excellent Colombian material as representing a new species, allied to the Costa Rican *S. brenesii* Kobuski on account of the indumentum of the apex of the ovary and the lower half of the styles, and because the filaments are not or only slightly thickened at the base.

Symplococarpou australe Sandwith et Kobuski, sp. nov. ; *S. brenesii* Kobuski affinis, foliis margine haud distincte serratis, sepalis secus totum marginem longius ciliatis, petalis majoribus longioribus, staminum mucrone apicali antherae ipsi subaequilongo vel etiam longiore differt.

Arbor parva, ad 10 m. alta, ramulis glabris parce lenticellatis in rimas transversas facile fissilibus. *Folia* elliptica, oblongo-elliptica vel rarius fere oblanceolata, apice acuminata, basi cuneata ac in petiolum sensim attenuata, 3-9 cm. longa, 0.9-3.6 cm. lata, tenuiter coriacea, glabra, margine leviter satis indistincte undulato-serrulato, utrinque nitidula, costa supra impressa subtus valde prominente, nervis venulisque utrinque prominulis intricate reticulatis, primariis circiter 8-10-jugis patulis marginem versus anastomosantibus ; petioli 2-5 mm. longi, supra canaliculati. *Flores* albi, 2-7-fasciculati ; pedicelli graciles, flexuosi, demum recurvi, 1.3-1.6 cm. longi ; bracteae circiter 1 mm. longae, pubescentes ; bracteolae apice pedicellorum vel multo inferius atque saepe alternatim dispositae, ad 0.8 mm. longae, ciliolatae, persistentes.

*Continued from K.B. 1951, p. 37

Hypanthium obconicum, glabrum, 2.5 mm. longum. *Calycis* lobi late ovato-suborbiculares, obtusi, sub flore aperto patuli vel patentes, omnes secus totum marginem conspicue ciliati, inaequales, 1.3–2.2 mm. longi, 1.5–2 mm. lati. *Petala* orbiculari-ovata, 5.3–7 mm. longa, 4.5–6 mm. lata, basi brevissime late unguiculata, margine dimidio superiore incurvato. *Stamina* 20–25; filamenta 2–2.5 mm. longa, glabra, basi haud vel leviter incrassata; antherae 0.6–0.75 mm. longae, mucrone (“cauda”) 0.5–1 mm. longo. *Ovarium* vertice dense hirsutum; styli 2, fere 3 mm. longi, dimidio inferiore hirsuti; ovula pro loculo 3 (an semper?). *Fructus* immaturus plus minusve anguste ellipsoideo-pyriformis, maturus late ovoideo-subglobosus 1.8 cm. longus 1.5 cm. diametro, glaber, rugulosus, lobis calycinis suberectis coronatus. *Semina* matura non visa.

COLOMBIA. Cauca; highlands of Popayán, as very scattered individuals in dense forests on the Rio Huangubío, 1700–1800 m., fl. Dec. 1885 (type in Kew Herb.), fr. 1889, *F. C. Lehmann* no. “B.T.” [“Bentham Trust”] 963. “Wächst sehr vereinzelt in dichten Wäldern. Bis 10 m. hohe Baumart mit grossen dichten überhängenden Zweigkronen. Blätter dünn ledern, tief dunkelgrün, glänzend. Blüten weiss.”

There are 4 sheets, 2 with flowers and 2 with fruits: the big label with the full field-notes, ending with the words “Blüht in Dezember. 1889.”, has been mounted on one of the sheets with fruit alone; another small label, mounted with one of the flowering specimens on another sheet, has the words (in pencil), “Popayan. Huangobio. Bl. weiss. 1885.” The inference is that Lehmann made two gatherings, perhaps but not necessarily from the same tree, a flowering one in December, 1885, a fruiting one in 1889. These were placed together and never numbered by Lehmann himself: the “Bentham Trust” number was given, much later, at Kew, when the entire material was incorporated in the Herbarium. It was mounted on 4 sheets, and there were no duplicates.

Occasionally the pedicels, instead of being strictly fasciculate, arise from an extremely short but definite axis, and a single instance of a branched pedicel bearing two flowers has been noted. Only two ripe fruits, of different sizes, are with the material, and these have not been cut open, so that no description is given of the seeds.

The new species differs from *S. brenesii* in the indistinctly serrulate leaf-margin, resembling that of the rest of the species (the strong serration of the leaves of *S. brenesii* is quite distinct in the genus); in all the calyx lobes being regularly and conspicuously ciliate with longer hairs (in *S. brenesii* only those lobes or portions of lobes are ciliolate which were exposed on the imbricate bud; thus the innermost lobes are eciliolate); in the longer and broader petals (this apparent distinction needs verifying by the examination of mature flowers from further collections of *S. brenesii*); above all, in the proportionate lengths of the filament, the anther and its mucro or “cauda”, and especially in the long mucro (about as long as or longer than the anther) which exceeds that of all the known species except *S. purpusii* with its very long mucro of 1.5–1.75 mm. (in *S. brenesii* the short mucro is only about half as long as the anther). The pedicels of *S. australe* are longer than those of the material of *S. brenesii*, and there are usually more flowers in the fascicle, while the ciliolate bracteoles are frequently situated well below the hypanthium and often alternately at some distance from each other; but such

apparent distinctions as these are of very doubtful taxonomic significance. Indeed, the validity of all the characters so far used for distinguishing species of *Symplococarpon* needs testing by the collection of abundant material in all stages of development throughout the range of the genus.

Airy Shaw described the loculi of the ovary of *Symplococarpon* as bearing 1, more rarely 2 ovules ; and Kobuski stated in his review that the ovules were solitary in each loculus. Later, Lundell wrote that the ovary of *S. lucidum* Lundell has 2 or 3 ovules in each loculus, while in *S. multiflorum* Kobuski (Stork no. 2305) "no less than 7 ovules are present in some cells". Kobuski and Sandwith have found 3 ovules in each loculus of ovaries of *S. australe*, and Kobuski now believes that all the species of the genus have an indefinite number, with only a single one, which is larger than the others and extends lower down into the ovary, developing into the future seed : the number of ovules may vary considerably in all the species, but it is more than one in each loculus.

The fruits of all the species are usually collected in an immature state, when they are narrowly ellipsoid-oblong or pearshaped. The ripe fruits of *S. australe* show how much they swell on reaching maturity, becoming much larger and almost subglobose ; and it is probable that the measurements of the ripe fruits of other species will be found to exceed those of the original descriptions.

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British Plants and their Uses*.—A book on the uses of British plants is a welcome change from the unending stream of popular descriptive floras, and the present work contains a great deal of information interesting alike to professional and amateur. The title is a little vague, perhaps deliberately so, for a considerable proportion of the plants enumerated have little claim to be considered British plants, save only in the sense that they are cultivated here. The information given is on the whole accurate and attractively presented, though at times the author has lapsed into the catalogue style—attempting to compress too much into too small a space. *Inula Helenium* is scarcely native here, and the Gerard text illustrations are often more quaint than useful (those of the Couch Grass and Wild Sea Cabbage do not represent *Agropyron repens* and *Brassica oleracea*). The page illustrations are too stiff to be pleasing, but the photographs are excellent.

R. D. MEIKLE.

*H. L. Edlin. B. T. Batsford Ltd., London, 1951, pp. 152, price 15s. net.

A New British Flora*.—While few countries are so lavishly provided with popular descriptive plant-books and local Floras, serious students of the British flora have for many years suffered from the want of a comprehensive, detailed, scientific account of the flowering plants and vascular cryptogams of the British Isles. There are, indeed, several good reasons for this unfortunate state of affairs :— the Universities have, until recently, concentrated attention on plant physiology and anatomy, leaving local taxonomy in the hands of amateurs, many of them ideally qualified to write a British Flora, but lacking the facilities, leisure, funds and confidence to put their wealth of knowledge and experience into print. The pages of the *Journal of Botany* and of local natural history periodicals bear ample evidence of amateur ability, but scattered papers in journals are a poor and patchy substitute for a comprehensive textbook. Professional taxonomists have always been *rarae aves* in this country, mostly exotic creatures, dwelling amidst the splendours of the tropical and sub-tropical plant-worlds, and only occasionally returning to cast an unofficial glance at their native heaths, or even more rarely condescending to put the results of their investigations on paper as “ a before-breakfast relaxation ”. British Floras by professional taxonomists have been few, and, with one notable exception, limited in scope intentionally, or, unintentionally, through want of personal experience in the field. The exception is Sir J. D. Hooker’s “ Students’ Flora ”, a wonderfully compact, accurate, balanced and lucid account of our plants, scarcely out of date despite the fact that it has not been revised since 1884, and still, I fancy, “ the only Flora of this country, fit to be put into the hands of a learner ”. Against it all succeeding Floras must be measured and judged. Of the remaining British Floras, Sir J. E. Smith’s “ English Flora ” is probably the most satisfying in form to the professional taxonomist, in that authorities and synonymy are given careful attention, but in content and classification it is now wholly inadequate and outmoded ; Bentham’s “ Handbook ” used in conjunction with Fitch and Smith’s “ Illustrations ” is, as was intended, an admirable book for beginners, but, even with Butcher and Strudwick’s “ Further Illustrations ” added, it cannot claim to cover the whole range of the British flora ; Babington’s “ Manual ” and Hayward’s “ Botanist’s Pocket Book ” are little more than *aides-memoire*, useful only in the hands of experienced botanists ; the “ Cambridge British Flora ” is too incomplete (and the completed portions often too crotchety) to be of real service, while Syme’s edition of Smith and Sowerby’s “ English Botany ” is too sumptuous, massive and diffuse for most private libraries. The Floras of Hudson, Withering and Lindley are now chiefly of historical interest.

Apart from scattered revisions and monographs, British systematists have had to rely on the literature listed above, all, with the possible exception of the “ Student’s Flora ” inadequate or outdated. Some may have been fortunate enough to have had access to copies of Rouy and Foucaud, Ascherson and Graebner, Hegi or other detailed Continental works, but these have never been widely available, and are, in any case, dangerous instruments in the hands of any who are not already

*Flora of the British Isles, by A. R. Clapham, T. G. Tutin and E. F. Warburg University Press, Cambridge, 1952, pp. 1591, price 50s. net.

well acquainted with Continental plants, or who cannot make use of the national collections to compare British and Continental material. Indeed one might go so far as to say that the faulty interpretation of Continental Floras has to a great extent been responsible for the regrettably large "spoil-bank" of misidentifications and errors thrown up during the past fifty years.

The work under review is therefore, without the smallest doubt, a very timely arrival, not just another book on British plants, but an ambitious, comprehensive and critical treatment of our present-day flora. In form and content it is clearly descended from the "Students Flora", though size precludes it from being a botanists' pocket-book (one doubts if Hooker was suitable for this purpose except in the largest pockets), and its price may be a shock to those who found Hooker dear at ten shillings and sixpence. Still these are minor considerations; it is a handy book, nicely printed on fine Bible paper which is perhaps a shade too translucent for comfortable reading. The price is not excessive by modern standards, and even the most critical purchaser will soon realize, I am sure, that his money has been wisely spent. It is, in brief, an indispensable volume even in the humblest student's library. Careful perusal of the contents has failed to disclose any blunders of the first magnitude, and it would be tedious to harp on the minor blemishes and slips which inevitably occur in first editions of such works, even where a single author has had time and patience to erase, alter and correct. The fact that the Flora is a product of triumviral ingenuity has perhaps been the cause of one weakness, a certain inconsistency which will be painful to those who find comfort in the uniformity of a single botanical outlook; this inconsistency is generally of small account, but occasionally it obtrudes too far—in the *Cruciferae*, for instance, about ninety alien or introduced species are included, while in the *Papilionaceae* only twenty six are mentioned, though Druce (British Plant List) records two hundred and fifteen alien and introduced species in this family. One does not demand all or nothing, but some uniformity in the treatment of the alien element in the flora is desirable. Similarly, as regards hybrids, these are sometimes, as in *Salix*, given detailed treatment, while at other times, a bare list is provided, which, in the case of *Carex*, includes some hybrids which must be so exceedingly rare in this country, that one wonders if the list was based on trustworthy records.

Critical groups are, on the whole, treated satisfactorily and with commonsense; where there are faults, criticism must, in most cases, be directed not against the authors, but against our very imperfect knowledge of the critical element in the British flora. What a lot of work remains to be done in groups such as *Thalictrum*, *Rhinanthus*, *Euphrasia*, *Limonium* and *Salicornia*! Even the most careful compilation of existing information leaves the reader more than a little hesitant and unconvinced knowing, from field experience, that Nature has a disconcerting way of obscuring characters which seem plain and straightforward in the study. Here and there the authors have accepted too readily the judgments of the past: three very dubious species of *Erophila* are, for instance, recorded (despite Winge's recent researches on the genus) while *Capsella bursa-pastoris* is regarded (and I think rightly) as a single variable species, though in fact many of its variants have as good a claim to microspecific

rank as those of *Erophila*. The frequent use of the *subspecies* is perhaps regrettable at a time when the term is still given a wide variety of meanings—moreover its use occasionally gives rise to a misleading and unnatural botanical hierarchy, exemplified in the case of *Caltha radicans* T. F. Forst. which becomes a variety of *Caltha palustris* ssp. *minor*, though *radicans* has, morphologically and ecologically, little in common with *minor*. *Galium palustre* ssp. *tetraploideum* is surely a case where valour has stolen a march on discretion !

The treatment of families and genera will be novel to many botanists, and though the alterations may throw a clearer light on the origin and relationships of our plants, one wonders if the claims of convenience, which rank high in a book of this sort, have not been underestimated. Phylogeny is a fascinating study when illustrated by a world-wide range of families and genera, but the British flora presents such a disconnected and imperfect image of the whole plant kingdom, that the value of a phylogenetic arrangement is largely lost. The Bentham and Hooker system, even if in places scientifically objectionable, has, so far as this country is concerned, at least one great advantage over other systems—the British student can find his way through a book arranged by it without having to turn repeatedly to the index for guidance. The generic “splits” are more distressing—even the professional may scratch his head over *Naumbergia thyrsiflora*, *Cicerbita alpina*, *Zerna erecta* and the like, all unfamiliar names which will, alas, probably have been superseded by a fresh set of novelties before they have had time to become familiar. The modern rage for the “splitting” or debasement of genera is a serious matter, made more serious by the fact that the “splitters” are often unaware, or do not wish to be aware, of problems which lie a little beyond the circumscribed range of their knowledge. Genera which appear to be valid in Europe may well fall to pieces when extra-European species are examined. In fact, where there is any doubt, aggregate genera will always be more satisfactory, and more convenient, than a multiplicity of doubtful segregates.

The biological date included in the new Flora will be welcomed by all, though it might have been still more useful had it been a little less condensed. Distribution is too often based on the “Comital Flora”, and is, in consequence, frequently inaccurate. More reliable records are available and should have been used. The text-figures are generally poor, and sometimes (as in *Adonis* and *Ulmus*) downright misleading. They should be completely revised, or else altogether omitted, in future editions. The popular names are useful *where they are* popular names, but why must we continue to give vernacular names to plants which never had them, nor are ever likely to have them? The repetition of epithets decapitalized and capitalized serves no purpose, and consumes a great deal of valuable space.

It is easy to criticize, and difficult to write a British Flora without exposing oneself to a flood of criticism—the new flora is an admirable achievement, and will, without doubt, be the most used and a most useful book in botanical libraries throughout this country.

R. D. MEIKLE.

CONTRIBUTIONS TO THE FLORA OF TROPICAL AMERICA :

LIV.*

NEW TREES AND SHRUBS FROM BRITISH GUIANA.

ANNONACEAE.

Guatteria (Sect. *Dolichocarpus* R. E. Fr.) **flexilis** R. E. Fr., sp. nov.

Arbor circ. 10 m. alta ; ramuli novelli pilis albidis adpressis vestiti, mox glabrescentes ; internodia 1–2 cm. longa. *Foliorum* petiolus supra canaliculatus, 8–15 mm. longus, parte inferiore (petiolus verus) circ. 4–8 mm. longa incrassata et mox glabrescente, parte superiore alis angustis laminae decurrentis marginata ; lamina membranacea, concolor, supra glabra, subtus pilis sparsissimis decumbentibus vel adpressis instructa, demum glabrescens, oblanceolata, basin versus sensim longeque angustata et in petiolum longe decurrens, apice sat abrupte in cuspidem 1–1.5 cm. longam obtusam contracta, 10–16 cm. longa et 3–5 cm. lata ; costa supra paulo impressa, subtus elevata, teres, pallida ; nervi laterales 9–10 utrinque, supra plani vel parum impressi, subtus prominuli, angulis circ. 50°–70° exeuntes, sursum curvati et 3–4 mm. intra marginem sat irregulariter arcuato-conjuncti ; reticulum venularum laxissimum, utroque latere parum conspicuum. *Flores* ex axillis foliorum delapsorum solitarii (an semper ?) ; pedicelli rigidi, saepe curvati, prope basin articulati, glabri, 2–3 cm. longi. *Sepala* rotundato-ovata, acutiuscula, 2.5 mm. longa, circ. 3 mm. lata, extra sericea. *Petala* lineari-oblonga vel oblongo-oblanceolata, apice rotundata, extra praesertim ad basin sericea, intus tomentella, 1.4–1.8 cm. longa, 4–5 mm. lata. *Stamina* 1.3–1.5 mm. longa, connectivi disco plano breviter sed conspicue setuloso. *Monocarpia* numerosa, exsiccata nigra, glabra sed rugulosa, cylindrico-vel oblongo-ellipsoidea, apice rotundata, basi obtusa vel brevissime acutata, 11–14 mm. longa et 5–6 mm. lata, stipitibus rigidis circ. 8 mm. longis sustenta.

BRITISH GUIANA. Winiperu Creek, Essequibo River, in Greenheart forest on light brown sand, March 16th, 1948, *Forest Dept.* no. 5603 (type in Kew Herb.).

This species belongs to the Section *Dolichocarpus* R. E. Fr., in which it stands rather isolated. It is most nearly connected with *Guatteria subsessilis* Mart., which belongs to the flora of Amazonas (Brazil and Venezuela). From this the new species differs widely by thinner, oblanceolate leaves, tapering more gradually towards the base, by smaller flowers and, above all, by considerably longer pedicels. The setulae on the connective discs are moreover a little longer and more conspicuous.—R. E. FRIES.

An additional collection, not seen by Prof. Fries, is *Forest Dept.* no. 6336, from the Sibaruni Creek, Demerara River, Sept. 5th, 1950. This was a tree 20 ft. high, 4 in. diam., from second growth on summit of ironstone ridge. Its flowers were fleshy and pale green.—N. Y. SANDWICH.

*Continued from K.B. 1952, p. 251.

Duguetia decurrens R. E. Fr., sp. nov.

Arbor circ. 20 m. alta ; ramuli novelli pilis stellatis rigidis rufo-ferrugineis dense vestiti. *Foliorum* petiolus 8–10 mm. longus, supra canaliculatus ; lamina membranaceo-chartacea, supra laevis et glaberrima, subtus primo densissime olivaceo-tomentosa glabrescens, adulta pilis stellatis rigidis plus minus laxis (in costa densioribus) instructa, elliptica vel obovata, basi vulgo longe angustata et in petiolum decurrens, apice vulgo abrupte in cuspidem 1–2 cm. longam contracta, 12–18 cm. longa et 5–7 cm. lata ; costa supra in sulcum angustissimum conspicue impressa, subtus valde elevata striata ; nervi laterales 10–12 utrinque, tenues, 3–4 mm. intra marginem arcubus regularibus conjuncti ; reticulum venularum densum, subtus elevatum. *Flores* solitariae e parte superiore internodii exeuntes, pedicello olivaceo-tomentello crasso rigido 8–15 mm. longo sustenti. *Sepala* inter se libera, ovata, obtusiuscula, rigida, tuberculata, 8–10 mm. longa, 6–8 mm. lata, petalis fere duplo breviora, dense olivaceo-stellato-tomentella. *Petala* crassa, rhombeo-elliptica, apicem versus breviter acutata, extra et basi glabra excepta intus dense cinereo-tomentella, 12–15 mm. longa, 6–8 mm. lata. *Stamina* circ. 0·8 mm. longa. *Fructus* (vix maturus) globosus, 18–20 mm. diam. ; monocarpia obconica, apice rotundato-truncata, longitudinaliter striata, basi glabra ceterumque brevissime et densissime cinereo-tomentella, 6–7 mm. longa.

BRITISH GUIANA. Mahdia River, Potaro River, 107 miles Bartica–Potaro Road, on lateritic ironstone soil, Jan. 15th, 1943, *Forest Dept.* no. 3764 (type in Kew Herb.).

This species bears a striking resemblance to *Duguetia pauciflora* Rusby, occurring in Venezuela. However, it seems to differ especially by having a different indumentum. The stellate scales characteristic of *pauciflora* are lacking in the new species and are replaced by stellate hairs with rigid, free rays. Further, the leaves taper more gradually towards the base and are more decurrent. The petals are covered on the outside by thick, soft, grey hairs.—R. E. FRIES.

LAURACEAE.

Nectandra miranda Sandwith, sp. nov. ; nulla affinitate manifesta, foliis basi auriculato-cordatis, inflorescentia spiciformi, bracteis persistentibus, tepalis intus glabris sub fructu persistentibus, bacca satis longa valde insignis.

Arbor parva ; ramuli teretes, pilis patulis rufo-brunneis tomentosi, senectute glabrescentes. *Folia* anguste elliptico-oblonga vel oblanceolata-elliptica vel oblanceolata, apice conspicue (1–1·5 cm.) acuminata, basi ipsa (1·5–2·5 cm. lata) leviter sed conspicue pulchre auriculato-cordata atque 7-nervia, 15–30 cm. longa, 5·5–10·2 cm. lata, firme chartacea, supra glabra crebre minute punctulata siccitate opaca olivaceo-nigrescentia, subtus secus costam nervosque primarios pubescentia ceterum glabrescentia vel glabra, costa supra prominula subtus prominente, nervis primariis utroque costae latere 8–10 imis subrectis superioribus arcuato-ascendentibus ac anastomosantibus supra planis vel immersis subtus prominentibus, venulis supra immersis subtus conspicue reticulatis ; petiolus crassus, brevis, 0·5–1 cm. longus, 3–4 mm. crassus,

brunneo-tomentosus. *Inflorescentia* axillaris vel pseudoterminalis, e foliorum squamiformium axillis oriens, stricte racemiformis, scilicet spiciformis, 8–9 cm. longa, igitur foliis multo brevior, ubique dense brunneo-tomentosa ; bracteae sub anthesi peristentes, lanceolatae, 4.5–6 mm. longae ; bracteolae minores, 3–3.5 mm. longae, 1–1.2 mm. latae ; pedicelli brevissimi, vix 1.5 mm. longi. *Flores* albidii, hermaphroditi, 9.5 mm. diametro, tubo brevi. *Tepala* ovato-oblonga vel ovata, 3–3.75 mm. longa, 2.5–3 mm. lata, obtuse acuta, omnia intus glaberrima ; 3 exteriora longiora et magis elliptico-ovata, extra ubique brunneo-tomentosa ; 3 interiora magis rhomboideo-ovata, extra vitta tomentosa triangulari-lanceolata e basi oriente praedita ceterum glabrescentia. *Stamina* 6 exteriora subsessilia, antheris transverse ellipticis, eglandulosis, siccitate papillosis, 1–1.2 mm. longis, 1.2–1.5 mm. latis, locellis 4 prope apicem introrsis subhorizontalibus leviter arcuatim dispositis ; 3 interiora basi glandulis confluentibus circiter 0.75 mm. diametro praedita, antheris 1.2 mm. longis, locellis 2 inferioribus extrorsis 2 superioribus lateralibus. *Ovarium* glabrum, 1–1.2 mm. longum, 0.75–1.2 mm. diametro ; stylus paulo brevior, circiter 0.75 mm. longus ; stigma conspicuum, late discoideum, 1.2–1.5 mm. diametro. *Fructus* pedicello elongato incrassato sulcato-rugoso 5–6 mm. longo, tubo calycino cupuliformi subhemisphaerico statu vivo scarlatino 4 mm. longo ad 1 cm. lato, tepalis conspicue persistentibus ; bacca ellipsoideo-oblonga vel obovoideo-oblonga, siccitate nigra, 2 cm. longa, 8–9 mm. diametro.

BRITISH GUIANA. Issineru Creek, Mazaruni River, in "Morabukea" forest on red lateritic soil, March 4th, 1949, *D. B. Fanshawe* in *Forest Dept.* no. 6010 (type in Kew Herb.) : tree 10–15 ft. high, 1 in. in diameter. "Flowers off white, large, in a rufous-tomentose inflorescence ; fruit obovoid, glossy, green ; cupule scarlet, with marked calyx lobes."

This is an anomalous and remarkable species within the genus *Nectandra*, combining such interesting characters as cordate leaf-base, racemiform inflorescence, persistent bracts, and persistent tepals on the fruiting cupule. In addition, the tepals are glabrous on the inner surface, an unusual feature in *Nectandra*. For the present, having discovered no affinity with any American species of *Lauraceae*, I am placing this species within *Nectandra*, of which it has the staminal characters. In support of this decision I may cite the evidence of an analogous species in the genus *Ocotea*, viz. *O. lanata* (Nees) Mez, which has somewhat similar inflorescences with persistent bracts, and tepals glabrous within, but the staminal characters of *Ocotea*, and the fruiting cupule entire, without persistent tepals.—N. Y. SANDWITH.

SAPINDACEAE.

Paullinia concinna Sandwith, sp. nov. ; Sect. *Neuroptilon* Radlk., *P. triantennatae* F. R. Silveira affinis, foliis 5-foliolatis, foliolis minoribus, praesertim fructu multo minore facile distinguitur.

Frutex scandens, ramulis indumento adpresso furfuraceo canescente indutis ; internodia 1.5–3 cm. longa. *Folia* parva, tota ad 10 cm. tantum longa, 5-foliolata ; petiolus 1–2.5 cm. longus, supra canaliculatus, indumento ramulorum praeditus adjectis superne pilis nonnullis patulis longioribus ; internodium rhacheos 1–1.8 cm. longum, superne gradatim angustissime alatum, indumento simili ; petioluli 1–2 mm. longi ;

foliola inferiora ovata vel ovato-elliptica, intermedia elliptica, foliolium summum obovato-ellipticum vel oblanceolatum, omnia apice breviter obtuse satis late cuspidato-acuminata vel obtusa tantum, basi obtuse vel acute cuneata, foliolium summum basi longe acutissime attenuato-cuneatum, 2.3–6 cm. longa, 1.2–2.8 cm. lata, firme chartacea vel subcoriacea, superne conspicue crenato-dentata, costa nervisque primariis utrinque minute puberulis, praeterea subtus pilis longioribus nonnullis prope basin nervorum primariorum saepe praedita, ceterum glabra, venulis utrinque vel saltem subtus prominulo-reticulatis, pellucido-punctata. *Stipulae* subulato-lanceolatae, ad 5.5 mm. longae, vix ad 0.75 mm. latae. *Thyrsi* axillares, solitarii, 6–12 cm. longi, ubique sed haud dense griseo-furfuraceo-puberuli. *Flores masculi* albo-virides, pedicellati, pedicellis ad 2 mm. longis; sepala duo exteriora parva ovata vel ovato-orbicularia rotundato-obtusa 0.8–1 mm. longa atque lata, sepalum quartum liberum ovatum vel ovato-ellipticum rotundato-obtusum 1.5 mm. longum 1.3 mm. latum, sepala tertia atque quinta elliptica elliptico-oblonga vel obovato-elliptica rotundato-obtusa inaequalia sese imbricantia sed basi tantum connata 1.5–1.7 mm. longa 1–1.3 mm. lata, omnia extra plus minusve minute strigoso-puberula; petala 1.5 mm. longa; stamina filamentis inaequalibus pilosulis 0.8–1.5 mm. longis. *Flores feminei* haud visi. *Capsula* pyriformis, 6–7 mm. longa, 4–5 mm. diametro, glabrata vel minute sparse pilosula, scarlatina, basis in stipitem 3–5 mm. longum attenuata, apice trialata alis rigidis anguste oblongis 5–7 mm. longis basi 2 mm. sursum plerumque circiter 1.3 mm. latis horizontaliter patentibus vel nonnunquam patulo-ascendentibus apice sursum plus minusve falcato-curvatis striato-nervosis nervis in corpus descendentibus ac ibi saepe costatis, valvis costa mediana notatis; stylus apice capsulae persistens, stigmatibus inclusis vix 1 mm. longus; semina nigra, subglobosa, 2.5 mm. diametro, infra medium arillo brunneo obtecta.

BRITISH GUIANA. Mahdia River, 107 miles Bartica–Potaro Road, fr. Jan. 9th, 1943, *D. B. Fanshawe* in *Forest Dept.* no. 3734 (type in Kew Herb.); *ibid.*, fl. Nov. 12th, 1943, no. 4203. Vines from low growth by the road, no. 3734 with scarlet fruits and glossy black seeds, no. 4203 with whitish-green flowers drooping on the inflorescence.

This is a very distinct species in the small section *Neuroptilon*, allied to the Brazilian *P. triantennata*, from which it differs in the 5-foliolate leaves with smaller leaflets, and the much smaller fruits with shorter wings. The Brazilian plant also has a much greater abundance of longer hairs, in addition to scurfy pubescence, on the branchlets, petioles and petiolules. The other species of the section have larger leaflets, and larger fruits with broader wings.—N. Y. SANDWITH.

EUPHORBIACEAE.

Drypetes fanshawei Sandwith, sp. nov.; *D. amazonicae* Steyermark atque *D. variabili* Uitt. affinis, ab utraque foliis regulariter crenatis floribus masculis antherisque multo minoribus sed disco magis conspicuo differt; praeterea ab illa staminibus 4 antheris glabris floribus femineis minoribus cum sepalis 4 atque stigmatibus minore, ab hac foliis haud coriaceis magis oblongis nervis primariis prope marginem ipsum neque conspicue longe a margine anastomosantibus distinguitur.

Arbor parva, ramulis glabris superne conspicue angulatis, internodiis 1-2.5 cm. longis. *Folia* elliptico-oblonga, apice conspicue cuspidato-acuminata, basi cuneata acuta rarius obtusa, hic saepe aliquantum inaequilatera, 9-18 cm. longa, 3.4-7.2 cm. lata, firme chartacea, glabra, nonnunquam indistincte sed semper regulariter late crenata, nervis primariis utroque costae latere 8-12 sursum fere usque ad marginem arcuatis ibique tantum secum anastomosantibus subtus cum costa prominentibus, nervis secundariis subhorizontalibus subparallelis cum venulis rete intricatum utrinque praesertim subtus conspicuum efformantibus ; petiolus 0.8-1.3 cm. longus, glaber, supra canaliculatus. *Flores masculi* usque ad 10 (vel plures?) in axillis foliorum fasciculati ; pedicelli pubescentes, 2.5-5 mm. longi ; sepala 4, late ovata vel ovato-oblonga, apice rotundata, ad 1.8 mm. longa, 1.3-1.75 mm. lata, extra sparse pubescentia, ciliata ; stamina 4, uniseriata, filamentis glabris 2-2.5 mm. longis, antheris 0.5 mm. longis atque paulo ultra latis ; discus glaber, conspicue sinuato-4-lobus ; ovarii rudimentum nullum. *Flores feminei* usque ad 10, similiter fasciculati ; pedicelli dense pubescentes, vulgo 5-7 mm. longi, sub fructu elongati ; sepala 4, eis floris masculi similia, ad 2 mm. longa atque lata ; discus annularis, plus minusve undulatus, haud lobatus ; ovarium ovoideo-urceolatum, dense adpresse flavo-pubescent, uniloculare ovulis geminatis, stigmate discoideo-capitato 0.75-1 mm. vel paulo ultra diametro. *Fructus* junior tantum visus, obovoideo-ellipsoideus, satis sparse pubescens.

BRITISH GUIANA. Yarikita Creek, Amakura River, March 31st, 1945, *D. B. Fanshawe* in *Forest Dept.* no. 5183 (♂ fls., type) and 5184 (♀ fls. and young fruits). Small trees, 20 ft. high, 2-3 in. diam., from creekside ; perianth green ; stamens white, erect ; young fruit erect, green.

This species resembles *D. amazonica* in the shape and texture of the leaves, but is easily distinguished from both that species and *D. variabilis* by characters of the male flowers. The regular crenation of the leaves is distinctive but should not be stressed, since a somewhat similar tendency has been seen on one specimen of *D. variabilis*, seedling leaves of which are quite sharply denticulate.—N. Y. SANDWICH.

MYRTACEAE.

***Eugenia conjuncta* Amsh., sp. nov.**

Ramuli brunneo-tomentosi. *Folia* oblonga, saepius obovato-oblonga, basi acuta apice longe anguste acuminata discoloria, chartacea, dense minute pellucido-punctata, 12-18 cm. longa, 5-8 cm. lata, juniora utrinque dense pubescentia, adulta pagina superiore sparse pagina inferiore densius pubescentia ; costa supra prominula, subtus prominente, utrinque pubescente ; nervis lateralibus utrinque 8-10, supra impressis, subtus prominentibus, arcuato-anastomosantibus, haud in nervum marginalem continuum decurrentibus ; venis laxo reticulatis, utrinque prominulis. *Petiolus* subteres, pubescens, \pm 1 cm. longus. *Flores* fasciculati, axillares et laterales ; pedicelli brunneo-tomentosi 8 mm.-1 cm. longi. *Bracteolae* lineares, 1-1½ mm. longae, tomentosae. *Alabastra* obovoidea. *Sepala* oblonga, in alabastro imbricata, globum petalorum includentia, \pm 6 mm. longa, subaequalia, extra tomentosa, intus parte apicali excepta glabra. *Petala* obovata, membranacea, ciliata, \pm 9 mm. longa. *Stamina* numerosa ; antheris oblongis. *Ovarium*

extra tomentosum, leviter sulcatum, 2-loculare, loculis 1-2-ovulatis, ovulis medifixis. *Fructus* ignotus.

BRITISH GUIANA. Right bank of Essequibo River, 4 miles above Gluck Island, Sept. 3rd, 1949, *Forest Dept.* no. 6108 (type in Kew Herb.). Tree of understorey, 30 ft. high, 3 in. diam., much branched. Leaves greyish with long drip-tip and edges recurved. Flowers in small cauliflorous umbels. Petals creamy, recurved; 2 bracteoles at base of calyx. Sepals recurved, thick, woolly outside. Stamens pink. Ovary inferior, 2-locular, each with a single medifixed axile ovule.

This beautiful species is well characterized by its large flowers and leaves and by its venation and indumentum; the few-ovulate ovary is probably also characteristic.—G. J. H. AMSHOFF.

RUBIACEAE.

Antirrhoea guianensis *Bremekamp*, sp. nov., corolla extra glabra, ovario ovulis pluribus instructo ad *A. albobrunneam* Urb. et Ekm., *A. heteroneuram* Urb. et Ekm., *A. rotundatam* (Griseb.) B. et H. accedens, sed foliis majoribus, corolla longiore ab eis diversa, ab *A. albobrunnea* et *A. heteroneura* insuper inflorescentiis longius pedunculatis, ab *A. rotundata* foliis acuminatis distinguenda.

Arbor 25 m. alta, trunco 0.5 m. diametro basin versus alato. *Rami* novelli glabri, paulum resinosi, mox cortice griseo-brunneo vestiti, 4-5.5 mm. diametro, internodiis plerumque 5-10 mm. longis. *Folia* petiolata; petiolus glaber, circiter 10 mm. longus; lamina anguste obovata, 7-13 cm. longa et 3-5 cm. lata, acuminata sed haud mucronata, basi sensim in petiolum contracta, subcoriacea, supra nitidula, subtus opaca, siccitate brunnescent, utrinque subglabra, costa nervisque subtus tamen pilis paucis instructis, axillis nervorum aliquorum domatiis ore pilosis munita, costa supra canaliculata, subtus prominula, nervis utroque latere costae plerumque 7, reticulatione distincta sed haud prominula. *Stipulae* ovato-triangulares, 7-8 mm. longae, plerumque ante folia deciduae. *Inflorescentia* pedunculo glabro 2-3 cm. longo instructa, ramulis dichasii 1.5-2 cm. longis, floribus 5-6 instructis. *Bractae* late ovatae 1.5 mm. longae. *Flores* 5-meri. *Ovarium* glabrum loculis 2 centralibus, 8 peripheralibus instructum. *Calyx* late campanulatus, tubo 1.5 mm. alto, lobis late triangularibus 0.7 mm. longis. *Corolla* lactea, tubo circiter 3 cm. longo et 2 mm. diametro, extra glabro, intus pubescente, lobis imbricatis 4.5 mm. longis. *Antherae* lineares 4 mm. longae, circiter 2 mm. infra os tubi remanentes. *Granula pollinis* minuta, 3-pora, poris annulo incrassato circumdatis. *Stylus* glaber, 6 mm. longus; stigmata 2 linearia, 4-5 mm. longa. *Drupa* glabra, matura nondum visa, immatura ovoidea 8 mm. alta, calyce coronata, seminibus pluribus instructa.

BRITISH GUIANA. Lower Essequibo River, Groete Creek, April 21st, 1943, *D. B. Fanshawe* in *Forest Dept.* no. 3991 (type in Kew Herb.). Tree 90 ft. high, 20 in. diam., with plank buttresses to 6 ft., from mixed forest on lateritic soil in rocky places. Leaves young, thinly fleshy. Flowers erect. Calyx green. Corolla long-tubular, milk-white, limb spreading. Young fruits ovoid, green. All parts glabrous.

This is the first known representative of the genus on the South American continent. There is also a species from Panama, but the latter is certainly not a near ally.—C. E. B. BREMEKAMP.

TRIANTHEMA PENTANDRA L. AND SOME RELATED SPECIES.

R. MELVILLE.

A very wide interpretation of the Linnean *Trianthema pentandra* has hitherto been accepted, embracing plants from Africa, Arabia, India and Australia. The Australian material has sometimes been referred to this species and at others to *T. decandra* L., depending on the number of stamens. In this family the staminal number is liable to vary considerably, and does not constitute a critical character, although it may have been adequate at the time of Linneus, when few species were known. Before the Australian plant could be named it was necessary to determine both the limits of variation of the Linnean species and the correct application of the names. The floral characters were found to vary considerably and after investigating staminal number, filament length, the proportions of the perianth segments and the length of their subterminal horns, as well as the proportions of the ovary and length of the styles, the conclusion was reached that the most critical features of the group resided in the mature capsules and in particular in the shapes of the valves of the operculum. Leaf shape is variable.

The name *T. decandra* L. was found to be correctly applied to the Indian species that has an operculum in which the two valves remain fused together and are separable only by force. The staminal number varies in different flowers from 10 to 15, but no constant correlation with other characters could be established in plants having different staminal numbers.

The type specimen of *T. pentandra* in the Linnean herbarium is too young to establish its exact identity with confidence. As Linneus attributed the species to Arabia some doubt remained whether it represented a species with a mainly African distribution or whether it was the pentandrous Indian species, since the distributions of both extend into Arabia. Plukenet's figure, to which Linneus refers, does not help as the details are not critically drawn. The matter was clarified by the discovery of Christensen's statement* concerning *Rocama prostrata* Forsskål, which is equated to *T. pentandra* L. :—"Linneus received seeds of this species from Forsskål and his species was described from plants raised from them". The appearance of the Linnean type is consistent with that of a cultivated plant. The material on which Forsskål based his *Rocama prostrata* was collected at Loha on the Arabian Red Sea coast. The generic and specific description occurs in the *Flora Aegyptiaco-Arabica* on p. 71, but the binomial is elsewhere, p. CVIII (no. 200). This circumstance may explain why De Candolle (*Prodr.* III, 352) took the first word of the description for the epithet, when he published *R. digyna*. By the courtesy of Dr. O. Hagerup, I have been able to examine the type specimen of *R. prostrata* from Forsskål's herbarium, housed in the University of Copenhagen. It represents a plant with flowers and full grown fruit and it is clearly identical with the African and not the Indian species. The name *T. pentandra* L. must therefore be applied to the plant with the predominantly African distribution. Drawings of the valves of

*C. Christensen : "Pehr Forsskål : *Flora Aegyptiaco-Arabica* 1775" in *Dansk. Bot. Arkiv.* 4 (3), 1922, 18, no. 22.

an operculum from Forsskål's type are given in Fig. 2 for comparison with the series from typical African plants in Fig. 3.

The oldest available name for the pentandrous Indian species appears to be *T. govindia* Buch. Ham. ex G. Don in Gen. Syst. 3, 72 (1834), where the combination first published in the Wallich Catalogue no. 6838 is validated. This number is represented in the Wallich herbarium, preserved at Kew, by a single sheet which is therefore the holotype. The specimen was collected at Munggen, June 1, 1811 and is a good example of the species. Drawings of the valves of a single operculum from the type are given in Fig. 4 and similar drawings from other specimens (Fig. 5) indicate the range of variation in the species.

The Australian material belongs to two new species and there is also an additional species from Africa. Amplified descriptions of *T. decandra* L., *T. pentanda* L. and *T. govindia* Buch. Ham. ex G. Don are appended together with those of the new species. The specimens cited are in Herb. Kew. or Herb. Sydney Bot. Gard. (S.) unless otherwise stated.

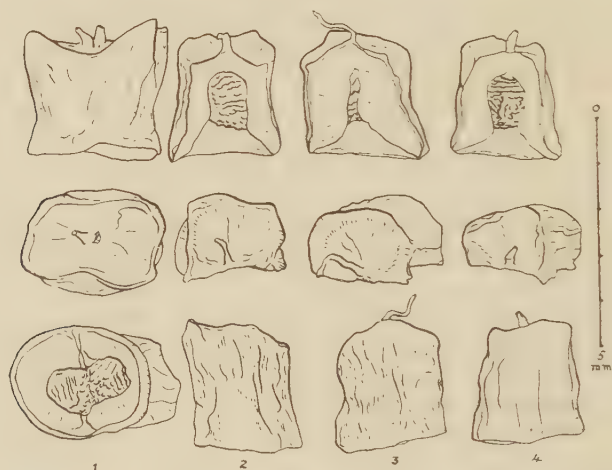


FIG. 1. *Trianthema decandra* L. Vertical rows: 1, 2. C. B. Clarke 10635 B. Madras Station; 3, Dr. Hunter 19.5.1825, Madras; 4, J. S. Gamble 12597, Beywada, Madras. Horizontal rows, upper: 1 entire operculum, 2-4 half opercula, inner face of valves, middle: tops of opercula, 1 entire, 2-4 halves, lower: 1 lower surface of operculum, 2-4 outer face of valves.

***Trianthema decandra* L., Mant. 1, 70 (1767).**

Caules prostrati, juventute papillis hyalinis duplo vel quadruplo longioribus quam latoribus dense tecti, demum subglabri. Folia opposita, anguste vel late elliptica vel obovata, laminis 8-15-20-40 mm. longis, 3-6-10-18 mm. latis, apice acutis vel rotundatis basi cuneatis, supra papillis minutis hyalinis tectis, subtus subglabris, petiolis $1/5-2/5$ longitudinis laminarum, marginibus scariosis basalibus ad $1/2-3/4$ longitudinis petiolorum attingentibus. Inflorescentia pauciflora (3-9), brevipedunculata vel subsessilis. Pedicelli 0.5-3 mm. longi; bracteae triangulari-acuminatae, scariosae, integerrimae vel denticulatae. Sepala elliptica vel ovata, obtusa, marginibus angustis scariosis, sepalorum rostra subterminalia longitudine varia. Stamina 10-15, sepalis subbreviora.

Styli 2, ovario subaequilongi. Fructus 3.5–4 mm. longi, 2.5–3.5 mm. lati, 2.5–3 mm. crassi. Summum operculum truncatum, cristis laterali-bus plus minus obtusis integris vel breviter 1-2-dentatis. Latera oper-culi subrecta longitudinaliter rugosa. Valvae operculi difficile separa-biles; facies commissurales valvarum angustae vel latiusculae, basi attenuatae, lacunis mediis anguste vel late linearibus vel interdum rotun-datis. Facies infera operculi profunde concava, leviter sulcata. Semina 4, circiter 1.7 mm. diametro, subpyriformia vel subglobosa, nigra, costis sinuatis crassiusculis instructa et plus minus pallide papilloso-cristata.

Typus in Herb. Linn., No. 527.4.

The Linnean type consists of a small branch in fruit and bearing elliptical acute leaves up to 22×9 mm. It is sufficient for recognition. Distribution: India, Ceylon.

The operculum truncate above, with parallel or concave sides and valves that remain firmly attached distinguish this species.

Trianthema pentandra L. Mant. 1, 70 (1767); *Rocama prostrata* Forssk. Fl. Aegypt. Arab. CVIII, 71 (1775).



FIG. 2. *Rocama prostrata* Forsskål. Three views of the valves of a single operculum from the type specimen. One valve (2) is slightly crushed.

Caules prostrati, juventute papillis hyalinis vel longioribus quam latoribus vel usque 0.5 mm. longis dense tecti. Folia opposita, anguste vel late elliptica vel ovata, laminis 6–15–25–35 mm. longis, 1.5–4–8–18 mm. latis, apice acutis vel rotundatis, basi cuneatis supra papillis minutis tectis, subtus subglabris, petiolis $1/4$ – $1/2$ longitudinis laminarum, marginibus scariosis basalibus ad $1/3$ – $3/4$ longitudinis petiolorum attingentibus. Inflorescentia compacta, sessilis, 6–20-flora. Flores sessiles vel brevipedicellati, virescentes; bracteae triangulari-acuminatae, scariosae, integerrimae. Sepala elliptica vel ovata late scarioso-marginata apici acuta, dorso marginibusque minute papillosa, sepalorum rostra subterminalia 0.3–1.0 mm. longi. Stamina 5, sepalis subbreviora. Styli 2, ovario longiores. Fructus 3–4 mm. longi, 2.5–3.5 mm. lati, 2–3 mm. crassi. Operculum griseum omnino papillis minutis tectum; Summum operculum vel truncatum vel a sutura mediana in cacumines vel cristas laterales obtusos obscure bidentatos vel sinuatos plus minus sensim adscendens. Latera operculi leviter expansa, recta vel basi scamno obtuso plus minus irregulariter cincta. Valvae operculi facile separa-biles; facies commisurales valvarum latae, basi arcuatae vel attentuatae, lacunis mediis anguste dilatatis vel sublinearibus. Facies infera operculi leviter concava fere laevis vel leviter bullata; semina 4, circiter 1.7 mm. diametro subreniformia vel subglobosa, nigra; costae seminarum rectae vel crenato-sinuatae, pallide papillosae.

Typus in Herb. Linn., No. 572.2.

There are two sheets under *T. pentandra* in the Linnean herbarium:

the first, numbered 572.2, bears "*pentandra*" in Linneus' handwriting and consists of a young plant just coming into flower : the second, numbered 572.3, is also a young plant just flowering. It had at first been labelled "*portulacastrum*", but this is scored out and "*pentandra*" is written in in Linneus' handwriting. In view of the name change it is preferable to regard No. 572.2 as the type. The latter specimen was probably grown from Forsskål's seed, as stated above.

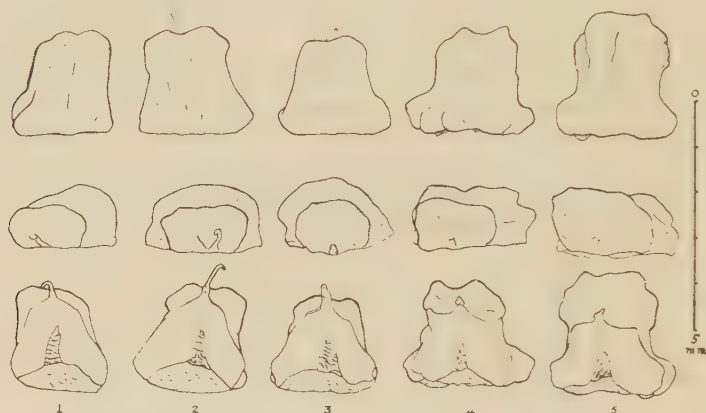


FIG. 3. *Trianthema pentandra* L. Opercular valves. Vertical rows : 1, 2 & 3 P. J. Greenway 812, Mwitikira, Dodoma Province, Tanganyika ; 4, L. C. C. Liebenberg 217, Kaka Mari, Karamoja District, Uganda ; 5. Kotschy 158, Sennar, A. E. Sudan. Horizontal rows : upper, outer surfaces ; middle, tops ; bottom, inner articulating surfaces.

Distribution : Senegal, Gold Coast, Nigeria, French and A.E. Sudan, Egypt, Palestine, Arabia, Abyssinia, Somaliland, Kenya, Uganda, Tanganyika, Mozambique, N. & S. Rhodesia, Angola, Transvaal, Madagascar, Socotra.

This species is distinguished by the smooth uniformly papillose operculum with blunt rounded crest and the base generally expanded into a rounded solid rim.

J. B. Gillett reports that it is eaten as a vegetable in Somaliland by Arabs and Indians but not by the Somalis. In the Sudan, A. F. Brown says it is used as a stomachic for men and cattle and also as a cure for gonorrhoea.

***Trianthema govindia* Buch.-Ham. ex G. Don, Gen. Syst. 3, 72 (1834) ;**
T. pentandra Auct. plur. non. Linn.

Caules prostrati, juventute papillis hyalinis usque sesqui-longioribus quam latioribus dense tecti. Folia opposita, orbicularia vel elliptica, lamina 4-9-13-30 mm. latis, 4-12-18-40 mm. longis, apice rotundatis vel acutis vel retusis, basi rotundatis vel cuneatis, supra et subtus papillis minutis hyalinis tectis, petiolis $1/3$ - $2/3$ longitudinis laminarum, marginibus scariosis basalibus $1/2$ - $3/4$ longitudinis petiolorum attingentibus. Inflorescentia compacta, subsessilis, 7-15-flora. Flores subsessiles ; bracteae triangulari-acuminatae, scariosae, plerumque denticulatae.

Sepala elliptica vel anguste ovata, obtusa marginibus scariosis ; sepalorum rostra subterminalia longitudine varia. Stamina 5, sepalis subbreaviora. Styli 2, ovario subaequilongi. Fructus 3·5–5 mm. longi, 2–3 mm. lati, 2–3 mm. crassi. Summum operculum a sutura mediana in cacumines vel cristas laterales 1–2 dentatos cito attentuatum. Latera operculi liris longitudinalibus non vel obscure instructis recta vel plus minus dilatata et basi scanno obtuso cincta. Valvae operculi plus minus facile separabiles; facies commissurales valvarum angustae, basi attenuatae, lacunis mediis late dilatatis. Facies infera operculi profunde concava, leviter bullata. Semina 4, circiter 1·5 mm. diametro, nigra, subpyriformia vel subreniformia crenato-costata et obscure pallide papilloso-cristata.

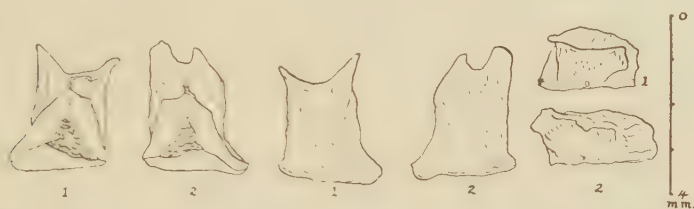


FIG. 4. *Trianthema govindia* Buch. Ham. ex G. Don. Three views of the valves of a single operculum from the type specimen, Wallich 6838.

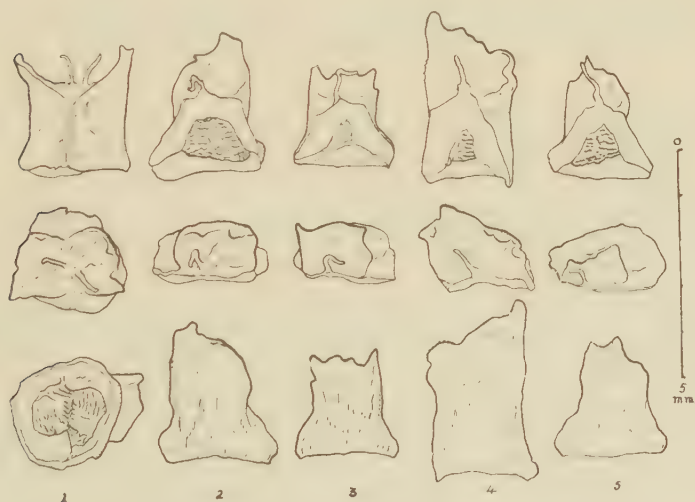


FIG. 5. *Trianthema govindia* Buch. Ham. ex G. Don. Vertical rows : 1, 2, Griffith 1627, Jalalabad, Afghanistan ; 3, 4, Major Madden, Fatteligarh, Benares ; 5, T. Thomson, Lahore. Horizontal rows : upper ; 1 lateral view of operculum showing mitre-like shape, 2–5 inner articulating surfaces of opercular valves ; middle, tops of 1, operculum, 2–5, half opercula ; bottom ; 1, lower surface of operculum, 2–5 outer face of opercular valves.

Typus : Herb. Wallich, no. 6838, Mungger, June 1, 1811, in Herb. Kew. Distribution : India, Persia, Arabia.

The operculum in this species commonly has nearly parallel sides rising laterally into sharp one or two pointed crests, the shape suggesting a bishop's mitre.

Trianthema australis Melville, sp. nov., *T. decandrae* L. affinis sed staminibus 5, fructus operculi valvis facile separabilibus, summis rotundatis et lateribus reticulatis differt.

Caules prostrati, juventute papillis hyalinis duplo vel triplo longioribus quam latioribus dense tecti. Folia opposita, elliptica vel elliptico-lanceolata, laminis 10–20–30 mm. longis, 4–7–10–20 mm. latis, apice rotundatis vel acutis, supra papillis minutis hyalinis tectis, subtus subglabris, petiolis $1/3$ – $2/3$ longitudinis laminarum, marginibus scariosis basalibus ad $1/2$ longitudinis petiolorum attangentibus. Inflorescentia laxiuscula, pedunculis 1.5–3 mm. longis. Flores pedicellati; bractee triangulari-acuminatae, scariosae, integerrimae vel sparse denticulae. Sepala elliptica 1.5–2 mm. longa, marginibus latis scariosis, apicibus obtusis vel acutis; sepalorum externorum rostra subterminalia breviuscula. Stamina 5, sepalis subbreviora. Styli 2, ovario aequilongi. Fructus 3.5–4 mm. longi, 3–4 mm. lati, 2.5–3.5 mm. crassi. Summum operculum rotundatum, cristis lateralibus breviter bidentatis. Latera

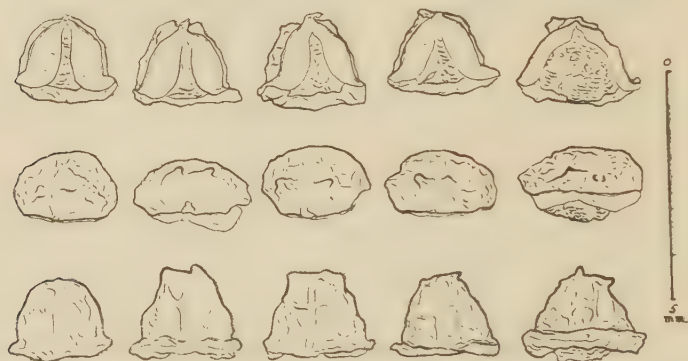


FIG. 6. *Trianthema australis* Melville. Three views (vertical rows) of opercular valves from the type specimen, Narrabri, N.S.W. Horizontal rows: upper, inner articulating surfaces; middle, tops; bottom, outer faces.

operculi liris distinctis reticulatis instructa, basi dilatata. Valvae operculi facile separabiles; facies commissurales valvarum latiusculae vel angustae, basi arcuatae vel attenuatae, lacunis mediis dilatatis vel sublinearibus. Facies infera operculi recta vel leviter concava vel plus minus everta, bullata, lucida. Semina 4, nigra, circiter 1.5 mm. diametro, subreniformia, fortiter crenato-costata et pallide papilloso-cristata, costis saepe in costas ampliores confluentibus.

Typus in Herb. Sydney, no. 13559, Isotypus in Herb. Kew., Narrabri, N.S.W., *Stock Inspector White*, April 1914. Distribution: New South Wales; Eugowra, S. 8485, *T. L. Bray*; Dubbo, S. 8484, *J. L. Boorman*, S. 13568 *A. R. Samuel*; Pilliga, S. 8486, *H. M. R. Rupp*; Moree, S. 8487, *J. H. Brooks*; Trangie, S. 13566, *H. Hollingdale*; Coonamble, S. 13560, *Sherwood*; Gilgandra, S. 13561, S. 13567, *J. D. Simon*, S. 13562, *E. L. Garling*; Narrandera, S. 13563, *G. E. Clarke*; Narromine, S. 8488, *S. W. Scott*; Barradine, S. 13565, *R. Walton*.

This species is recognised by the bonnet shaped operculum with the crest on the top poorly developed and by the distinct reticulate ridging of the sides. The base of the operculum is often everted.

Trianthea galericulata Melville, sp. nov., *T. decandrae* L. affinis sed staminibus 5-12, fructus operculi valvis facile separabilibus et forma faciei commissurae differt. *T. decandra* F. Muell., *Fragm.*, I, 173, pro parte, non L.

Caules prostrati, juventute papillis hyalinis usque duplo longioribus quam latoribus dense tecti, demum subglabri. Folia opposita late vel anguste elliptica, laminis 15-20-30-45 mm. longis, 4-10-15-20 mm. latis, apice late rotundatis vel acutis, basi cuneatis, supra papillis minutis hyalinis tectis, subtus subglabris, petiolis $1/4$ - $1/2$ longitudinis laminarum, marginibus scariosis basalibus ad $1/2$ - $2/3$ longitudinis petiolorum attingentibus. Inflorescentia compacta, sessilis vel brevi-pedunculata. Flores sessiles vel brevipedicellati; bractee triangulari-acuminatae, scariosae, sparse denticulatae. Sepala late ovata, marginibus latis scariosis, apicibus obtusis vel acutis, sepalorum externorum rostra subterminalia breviuscula, sepalorum internorum obsoleta vel deficientia.

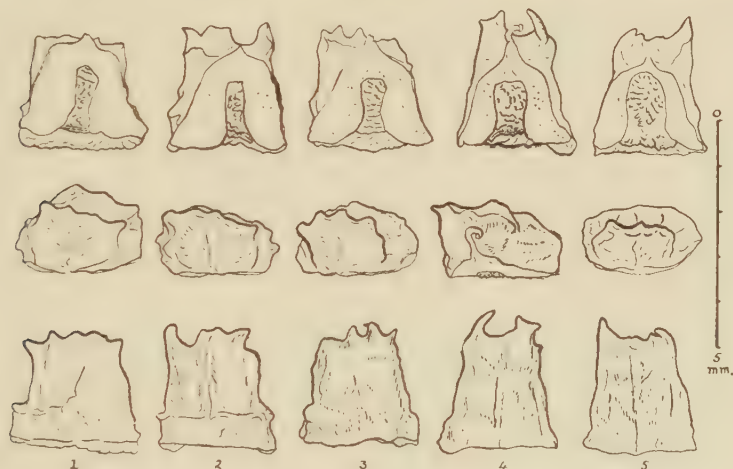


FIG. 7. *Trianthea galericulata* Melville, opercular valves. Vertical rows: 1-3 From the type specimen, A. Morris 2758, Langawirra Lakes, N.S.W.; 4, Horn Expedition, Opossum Well, W.A.; 5, S. Browne 1126, Flinders Range, Q., (S. No. 13575). Horizontal rows: upper, inner articulating faces; middle, tops; bottom, outer surfaces.

Stamina 5-12, sepalis subbrevia. Styli 2, ovario subaequilongi. Fructus 4-5.5 mm. longi, 3-4 mm. lati, 3-3.5 mm. crassi. Summum operculum vel truncatum vel a sutura mediana in cacumines vel cristas laterales 3-4-dentatos vel sinuatos plus minus sensim attenuatum. Latera operculi liris obscuris reticulatis instructa, recta vel basi scamno irregulariter acuto vel obtuso cincta. Valvae operculi facile separabiles; facies commissurales valvarum latiusculae, basi rectae vel arcuatae, lacunis mediis rotundatis vel sublinearibus. Facies infera operculi irregulariter concava, fortiter bullata, lucida. Semina 4, circiter 2 mm. diametro, subreniformia, nigra, fortiter crenato-costata et pallide papilloso-cristata.

Typus in Herb. Kew., Isotypus in Herb. Sydney, A. Morris, No. 2758, Langawirra Lakes, N.S.W., 19.4.1930. Distribution: South Australia; Between Cooper's Creek and Wills Creek, S. 13572, F. v. Mueller; Mt. Lyndhurst, S. 13570, Koch; Oodnadatta, S. 13571, S. 8489, W. Gill.

New South Wales ; Tiboburra, S. 8481, *O. E. Couch* ; Killara Stn., Louth, S. 13558, *L. Rostron* ; Wilkannia, Murtee Stn., S. 8482 ; Darling Desert, Victorian Expedition, K. Queensland ; Mulligan River, S. 13573, *H. Clarke* ; Flinder's Range, S. 13575, *S. Browne* ; Boulia, S. 13574 ; Peak Downs, *F. v. Mueller*, K ; Winton, *C. S. Sutton*, K. ; Mungallala, *C. E. Hubbard and C. W. Winders*, 6049, K. Western Australia ; Opossum Well, S. 13569, Horn Expedition.

The top of the operculum, in this species, is prolonged into sharp lateral ridges bearing 2-5 teeth. The sides are almost straight, but near the base often run out into an angular or somewhat rounded step or shelf (*scamus*). The name is derived from *galericulum*, originally meaning a little cap or hat, while in later times it came to mean false hair or a periwig. Here, it is appropriate for the general shape of the operculum and for the outline of a lawyer's wig formed by sutural surface of the opercular valves.

Trianthema redimita Melville, sp. nov., cum *T. pentandra* L. confusa sed capsulis amplioribus et cristis operculorum magis ornatis differt.

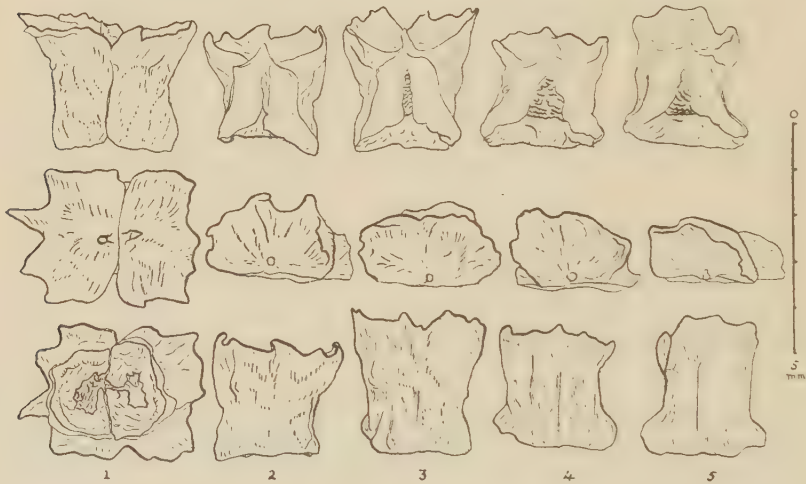


FIG. 8. *Trianthema redimita* Melville. Vertical rows : 1-3, from the type specimen, *J. R. Dale*, K. 700, Mudo, Kenya ; 4, *J. R. Shabetai* F. 1100, Wady Rabdeit, Egypt ; 5, *Brown* 1034, Rassala, A.E. Sudan, Horizontal rows : upper, 1, entire operculum lateral view ; 2-5, inner articulating faces of valves ; middle, 1 top of operculum, 2-5 tops of opercular valves ; bottom, 1 lower surface of operculum, 2-5 outer faces of valves.

Caules erecti (vel? decumbentes) juventute papillis hyalinis crassis longioribus quam latioribus sparse tecti, demum subglabri. Folia longiora, anguste vel late elliptica, laminis 5-15-20-37 mm. longis, 3-5-8-15 mm. latis, apice acutis vel rotundatis, basi cuneatis, supra papillis minutis tectis, subtus subglabris, petiolis $2/5$ - $3/5$ longitudinis laminarum, marginibus scariosis basalibus ad $1/2$ longitudinis petiolorum attingentibus vel aequilongis. Inflorescentia compacta sessilis, 3-15-flora. Flores sessiles vel brevi-pedicellati ; bracteae triangulari-acuminatae, scariosae, denticulatae. Sepala late ovata, obtusa, marginibus latis scariosis ; sepalorum rostra subterminalia longitudine varia,

vel sepalorum internorum deficientia. Stamina 5, usque $3\frac{1}{4}$ longitudinis sepalorum attingentia. Styli 2, ovario subaequilongi. Fructus 3-4.5 mm. longi, 3-4 mm. lati, 2.5-3 mm. crassi. Summum operculum truncatum interdum roseum, cristis lateralibus patulis vel suberectis, longe quadridentatis vel irregulariter sinuatis. Latera operculi recta vel basi scamno obtuso plus minus cincta. Valvae operculi facile separabiles; facies commissurales valvarum latiusculae, basi attenuatae, lacunis mediis sublinearibus vel dilatatis vel occlusis. Facies infera operculi recessu profundo praedita, distincte sulcata. Semina 4, circiter 1.5-2 mm. diametro, subreniformia applanata, nigra; costae seminarum in tuberculos rotundatos, plus minus fractae, pallide papilloso-cristatae.

Typus in Herb. Kew., *I. R. Dale*, No. K. 700, Mudo near Wajir, Northern Frontier District, Kenya. "Herb growing in fresh water pan, flowers purple".

Distribution: Tanganyika; Banagi Hill, *A. Moore*, 62; Kiruru, *A. E. Haaver*, 471. Uganda: Kikorongo, Ruenzori region, *T. D. Maitland*, 1046; Kangole, *A. S. Thomas*, 3456. Kenya: Mudo *I. R. Dale*, K. 700; Lake Rudolf, *R. H. Martin* 286; Kalalokoil River. Turkana, *M. T. Mortimer*; Sukiri Is., Kavirondo Gulf, *E. R. Napier and Mrs. Fox*, 6641; Somaliland: Burano-Warieto Tug. *J. B. Gillett* 4290. Abyssinia: *Kotschy* 68, sine loc. Anglo Egyptian Sudan: Rassala, *Brown* 1034; Dongala, *C. G. Ehrenberg*; Kordofan, *Kotschy* 70; Sea Coast, Lat. 21°, *J. T. Bent*; Suakin, *G. Schweinfurth* 796; Tamanib, *I. K. Lord*. Egypt: Wady Rabdeit, *J. R. Shabetai*, F. 1100, *Mrs. C. E. Palmer*, 55. Arabia: Gedda, *S. Fischer*, 10; Hadda Oasis, *A. C. Trott* 1332.

The top of the operculum is saucer shaped or nearly flat the edges rather sharp and prolonged into a variable number of teeth. These often form a star like crown encompassing the operculum—hence the name *redimita*. The upper parts of the operculum are sometimes tinged with red.

Plant Diseases*.—This attractively produced book will prove invaluable to all those interested in plant cultivation. It is a translation of the Second Danish edition, and has been adapted for English conditions by R. W. G. Dennis. Brief accounts of diseases which occur in this country, but have not yet been recorded from Denmark have therefore been added by the English editor.

A long felt gap in our literature concerning plant pathology has now been filled, as this work, unlike many others, deals with the subject mainly from the point of view of the growers themselves, rather than from the purely academic aspect. The emphasis is thus on the host and its reactions, and not on the fungus concerned. It is divided into five sections. The first deals generally with causative agents of plant diseases and injuries, and it is in this section that much useful, but often neglected

*Plant Diseases in Orchard, Nursery and Garden Crops. E. Gram and A. Weber. 618 pp. 1952. London, MacConald & Co. £4. 10. 0d.

information is accumulated. Growers not unnaturally are very observant people and are the first to detect any signs of injury to their crops. Frequently, however, much anxiety is caused by mistaking the symptoms of frost, heat and nutritional injury for those of fungal infection. In this first section the authors give an account of numerous agents which can cause injury under such headings as "Environmental Factors" (water relations); "Climatic and Other Physical Factors" (frost, low temperatures, heat, etc.); "Nutritional and Other Chemical Factors" (roles of mineral salts, damage which can result from sprays, etc.). Then follows a detailed description of diseases caused by a few common fungi which attack a large number of cultivated plants.

The following three sections each deal with the diseases of individual crops which are arranged alphabetically and are divided into Tree and Bush Fruit, Vegetables and Herbaceous Fruits, and Ornamental Plants and Trees. The known diseases of each crop are discussed and details given of the symptoms, cause and importance, together with an account of methods of control. A particularly praiseworthy feature of these three sections, is that following the account of the diseases of each main crop is a summary in the form of a Key using the symptoms produced in the different plant organs.

Part five gives a very valuable account of Control Methods in general and includes a list of the National Advisory Service Centres in the British Isles from which growers can obtain answers to their various enquiries, and identification of the causative agent of damaged or infected crops.

In any book of this kind, there is the difficulty of conveying in words, to the uninitiated, the symptoms of various plant disease so clearly that mistakes in identification are avoided. Thus it is that one comes to expect numerous photographs and illustrations, which can often capture and record those subtle differences—so difficult to describe. In this, one is not disappointed, and the photographs being of a very high standard, add enormously to the value of the work. There are ten coloured plates of which eight are devoted to the apple, the majority portraying physiological disturbances.

The authors and all connected with the publishing of this work are to be heartily congratulated. It suffers only one drawback, and that is its high price. Nevertheless, it will remain a standard work on the subject for many years to come, and will have an honoured place on the bookshelves of all Scientific Nurserymen, Fruit Growers, Market Gardeners and practising Plant Pathologists.

D. A. REID.

NOTE ON THE TAXONOMIC POSITION OF NYCTANTHES L. AND DIMETRA KERR

H. K. AIRY SHAW

The monotypic genus *Dimetra* was established by Kerr, in *Bull. Misc. Inf.*, Kew, 1938, 127 (1938), for a small herbaceous or slightly woody plant collected by himself in the open deciduous forests of eastern Siam in 1924. A good figure of the species, *D. Craibiana* Kerr, was provided (*l.c.* 128). Kerr assigned the plant, apparently without hesitation, to the *Oleaceae-Jasmineae*, and stated that its closest alliance was "clearly with *Nyctanthes*, which it resembles in many points." In giving this affinity, Kerr seems to have been undoubtedly correct. Among other points, a significant one, to which he fails to draw attention, and does not even mention in his description, is the bulbous bases of the hairs on the upper surface of the leaves: this is a conspicuous feature of the leaves of *Nyctanthes*.

The reference of these two genera to the *Oleaceae* (dating back, in the case of *Nyctanthes*, at least to Jussieu; *N. arbor-tristis* was indeed associated with octomerous species of *Jasminum* even by Linnaeus) must, however, be called in question. It is true that the corolla of *Nyctanthes arbor-tristis* is somewhat like that of a *Jasminum*, and that the technical characters of two stamens and a bicarpellary ovary with 1-ovulate carpels are also present. But in its general features and appearance the plant bears little resemblance to a *Jasminum*, or, for that matter, to any other member of the *Oleaceae*.

In Thonner's key in his *Flowering Plants of Africa* (1915), and also in that of Hutchinson, *Families of Flowering Plants*, 1, *Dicotyledons* (1926), these genera run down with little difficulty to the *Verbenaceae*, and this is surely their proper place, from every point of view; indeed, the *Verbenaceous facies* of *Nyctanthes* almost "hits one in the eye." (A *Verbenaceous* affinity for *Jasminaceae*, which included *Nyctanthes*, was suggested by Lindley, *Veg. Kingd.* 650: 1846.) The Siamese *N. aculeata* Craib, with its strongly aculeate stems, as in *Lantana aculeata* L., and its lobate-dentate leaves, recalling species of *Clerodendrum*, could scarcely belong to any other family than *Verbenaceae*. Although the contorted-rotate limb of the corolla of *N. arbor-tristis* is not typically *Verbenaceous* (but it is to be noted that the corolla of *N. aculeata* Craib is "obliquely and somewhat unequally 6-8-lobed": *vide* Kerr, *Fl. Siam. Enum.* 2, 409: 1939), an almost actinomorphic corolla is characteristic of several genera in that family, as also is the combination of a white or pale limb with a brightly coloured, orange or yellow, tube and throat. The strongly quadrangular stem is a well-known *Verbenaceous* character, exhibited by *N. arbor-tristis* to a marked degree: the branchlets suggest at first sight those of *Tectona*.

Pending further investigation, it may be suggested that the best place for the subfamily *Nyctanthoideae*, in Briquet's arrangement (*Engl. & Prantl, Nat. Pflanzenfam.* IV, 3A, 144: 1895), would be between the subfamilies *Viticoideae*, which includes the actinomorphic tribes *Callicarpeae* and *Tectoneae*, and the *Caryopteridoideae*, characterized by a capsular fruit.

Verbenaceae subfam. **Nyctanthoideae** *Airy Shaw*, subfam. nov. *Inflorescentia* cymosa, cymis capitatis involucriatis. *Corolla* actinomorpha vel fere actinomorpha. *Ovarium* biloculare, loculis uniovulatis, ovulis basalibus erectis. *Fructus* capsularis, dispermus. *Folia* supra pustulis albis piliferis scabrida vel hispida.

Since writing the foregoing, it has come to my notice that *Nyctanthes arbor-tristis* was actually described as a new genus and species of *Verbenaceae* nearly a century ago. The Italian botanist Bertoloni received a specimen among a miscellaneous collection of material sent by a correspondent from Mozambique, E. Africa, and, being apparently unacquainted with *Nyctanthes*, he described it as *Bruschia macrocarpa*, assigning the genus to the *Verbenaceae*, next to the genus *Lippia* (Bertol. *Miscell. Bot.* **18**, 16–18, t. 2 : 1858). The specimen (as is evident from the plate) was mainly in fruit, but a few late flowers remained, and it is most interesting that Bertoloni figures and describes the corolla as 5-lobed and bilabiate : the drawing in fact somewhat suggests the corolla of *Kentranthus*. Owing, apparently, to the somewhat unsatisfactory state of preservation of the material, Bertoloni was uncertain whether the lobes were entire or dentate, and possibly for the same reason he omitted to state the number of stamens present in the flowers ; he merely assigned the genus to the “ Class. Didynamia. Ordo Angiospermia. Ord. nat. Verbenaceae *R. Brown*,” and stated that the stamens were included in the throat of the corolla. If, however, he actually had an exceptional specimen, showing not only zygomorphic corollas but 4 stamens, the case for referring *Nyctanthes* to the *Verbenaceae* would need no further arguing. It would be worth watching for the appearance of such abnormal flowers in *Nyctanthes*, in the hope of being able to confirm Bertoloni’s observations.

In conclusion, it may be noted that the anatomy of *N. arbor-tristis* has been investigated by Indian botanists in some detail : cf. Majumdar in *Proc. Ind. Sci. Congr.* **23**, 298 (1936) ; Fotidar in *Journ. Ind. Bot. Soc.* **18**, 43–45 (1939) ; Majumdar, *ibid.* **20**, 119–122 (1941). It appears to exhibit several features that are at variance with the anatomy of the *Oleaceae*, but that would support the Verbenaceous affinity here suggested.

ANATOMICAL EVIDENCE FOR INCLUDING NYCTANTHES AND DIMETRA IN THE VERBENACEAE.

MARGARET Y. STANT.

Whilst examining herbarium specimens of *Nyctanthes arbor-tristis* Linn., Mr. H. K. Airy-Shaw was recently led to believe that the taxonomic affinities of this genus lie with the Verbenaceae rather than with the Oleaceae. Since it is now a common practice to take anatomical evidence into account when attempting to solve problems of this kind the microscopical structure of the vegetative organs of *Nyctanthes arbor-tristis* was examined at Mr. Shaw's suggestion. At the same time, *Dimetra craibiana* Kerr was also examined, since the natural affinities of this species were also doubtful. The material of *Nyctanthes arbor-tristis* examined, was taken from the herbarium specimen collected by H. Collett on 10.10. 1886. *Dimetra craibiana* was from herbarium specimen No. 8611 collected by A. F. G. Kerr. In addition, a small amount of living material of *N. arbor-tristis* from the Gardens was available for investigation. The following is a brief description of the chief anatomical features observed.

(1) *Nyctanthes arbor-tristis*.

LEAF

Lamina dorsio-ventral. **Hairs** of 2 types : (1) Unicellular trichomes present on both surfaces but more frequent on the lower than the upper epidermis. Trichomes largest on the upper surface, each of them being thick-walled and warty, and supported at the base by 8 adjacent epidermal cells which protrude from the surface. (2) Glandular hairs, often situated in slight depressions in the epidermis, and each consisting of one stalk cell and a quadrant of four head cells, are scattered over both surfaces, but are particularly numerous on the abaxial surface near its midrib. **Epidermis** on both surfaces mostly composed of cells with sinuous anticlinal walls, but those cells surrounding the bases of the hairs are hexagonal. **Stomata** confined to the abaxial surface ; anomocytic. **Mesophyll** including 1-2 layers of palisade cells. Vascular bundle of the midrib crescentic in cross-section and showing cambial divisions ; protoxylem and metaxylem consisting of radial rows of vessels separated from each other by fibres and parenchyma. The primary phloem is bounded by a ring of large parenchyma cells and an interrupted arc of sclerenchyma fibres. The median vein is also supported by collenchyma above and below. Lateral veins are small and each is surrounded by a parenchymatous sheath consisting of a few spiral vessels and some rudimentary phloem. **Petiole**, in transverse section through its distal end, exhibiting a shallow crescentic median vascular bundle flanked on either side by 2 or 3 smaller lateral strands. Towards the base of the petiole, the lateral bundles coalesce so that the vascular tissue has a crescentic but winged appearance in section. Xylem and phloem are similar in structure to those of the lamina.

STEM.

Description based on stems 2-3 mm. in diameter. Square in section with 4 longitudinal ridges, each including a cortical vascular bundle in which the xylem and phloem are inversely orientated. (According to

Fotidar, 1939, and Majumdar, 1941, the cortical bundles are not connected with the main stem, but arise from small lateral leaf trace bundles). **Hairs** similar to those of the leaf present before the cork is formed. **Epidermis** and **hypodermis** composed of thick-walled cells. **Cork** originating immediately below the hypodermis and consisting of 2-4 layers of thin-walled rectangular cells in the limited available material. Outer part of the **cortex** collenchymatous. **Pericycle** marked by an interrupted ring of thick-walled fibres. Similar sclerenchyma also accompanies the phloem of the cortical vascular bundles. ⁽¹⁾ **Xylem** in the form of a continuous cylinder. Vessels mostly in radial multiples of up to 8; others solitary or in oblique pairs: radial diameter of individual vessels ranging from 25-27 μ (mean of 50 readings, 40 μ): end walls oblique with simple perforations. Protoxylem including spirally thickened vessels with thinner walls. **Parenchyma** absent. **Rays** mostly uniseriate and occasionally biseriate; homogeneous, composed of upright cells. **Fibres** constituting the whole of the ground tissue of the xylem; each fibre rectangular in cross-section and provided with conspicuously bordered pits. **Pith** hollow; peripheral part composed of thick-walled parenchyma with large, simple pits.

(2) *Dimetra craibiana*.

LEAF

Lamina dorsiventral. **Hairs**: (1) Large unicellular warty trichomes present on both surfaces. The swollen bases of these hairs and the large epidermal cells supporting them give the epidermis a sinuous outline in transverse section. (2) Glandular hairs, each consisting of a unicellular stalk and a quadrant of 4 head cells, also present. **Cystoliths** fairly frequent in the bases of the hairs and in the adjacent epidermal cells. Upper epidermis composed of cells that are larger and more thick-walled than those of the lower epidermis. **Stomata** confined to the abaxial surface; anomocytic. **Epidermis** composed of cells with straight anticlinal walls, mostly 5-6 sided in surface view, and with thick outer walls. **Mesophyll**. Palisade tissue consisting of one layer of cells, except at the midrib, where there are groups of thick walled collenchymatous cells above and below the median vascular strand. The vein in the midrib is oval in cross section and surrounded by parenchyma; no fibres are present. **Xylem**, consisting of 7-8 radial rows of vessels, is separated from a narrow band of **phloem** by a cambial zone. The main lateral veins consist only of a few spiral vessels and a small group of phloem cells. **Petiole**, in transverse sections through the distal end, exhibiting 3-4 layers of collenchyma below the epidermis, which bears trichomes and glandular hairs. The main vein is strap-shaped and there are 1 or 2 smaller rounded bundles on either side.

STEM

Description based on stems 2-3 mm. in diameter. Transverse section square in outline, each of its four corner ridges traversed longitudinally by an inversely orientated cortical vascular bundle as in *Nyctanthes*. **Hairs**.

¹Majumdar (1941) interprets both zones of sclerenchyma as belonging to the phloem rather than the pericycle. This interpretation may well be true since, in many dicotyledons, there is no clear distinction between phloem and pericycle, and some anatomists hold that the term 'pericycle' should be eliminated. It is, however, convenient to retain the term for descriptive purposes.

Glandular hairs and trichomes present, as in leaf. **Epidermis** composed of thick-walled cells. A **hypodermis** of large cells also present. Cork arising immediately on the inside of the hypodermis. Outer part of the cortex collenchymatous. There is a layer of rectangular and slightly thickened cells, which might be interpreted as an **endodermis**, immediately outside the vascular cylinder. A similar layer surrounds each cortical bundle. **Pericycle** devoid of fibres. **Phloem** in the form of a narrow ring. **Xylem** including numerous small oval vessels, the radial diameter ranging from 18–32 μ , the mean of 50 readings being 24 μ . Vessels frequently in radial multiples of 3–8 ; others solitary or in tangential pairs ; lateral walls with small, alternate, bordered pits ; perforations simple, oblique. **Parenchyma** absent. **Rays** 1–2 cells wide, mostly uniseriate and consisting of upright cells. Ground tissue of the wood composed of **fibres** provided with bordered pits with slit-shaped apertures.

Root

The vertical, subterranean base of the stem is much thicker than the aerial portion and bears crowded, cylindrical roots. The proximal 10 cm. of each root is about 4 mm. in diameter, but this enlarged part passes abruptly into a branching fibrous portion. Anatomical investigation showed that the stele is constant in diameter throughout the length of each root, but surrounded by a much wider **cortex** in the broader part of the root. The stele is surrounded by an **endodermis** within which there is a parenchymatous pericycle 3–4 cells wide. There is a continuous cylinder of **phloem** and **xylem** and a **medulla** of thick-walled lignified parenchyma.

Discussion

(1) *Nyctanthes* and *Dimetra* resemble the Verbenaceae in the following respects :—Unicellular trichomes and multicellular glandular hairs both present. Cystoliths, which are characteristic of certain Verbenaceae, are frequent in *Dimetra*, but were not observed in *Nyctanthes*. Stomata of many of the Verbenaceae are diacytic but there are a number of genera in which, as in *Nyctanthes* and *Dimetra*, stomata are anomocytic. The young stem of both genera is quadrangular in transverse section with an inversely orientated vascular bundle in each of the four corners. In this respect there is a resemblance to *Chloanthes*, another member of the Verbenaceae, in which the stem is provided with wings supplied by a system of vascular bundles. Both genera have a well developed hypodermis in the stem, beneath which the cork arises superficially. The outer cortex is collenchymatous. A stem endodermis is present, but difficult to detect, in *Dimetra*, a feature which has also been noted in *Verbena*, *Phryma* and *Holmskioldia* amongst the Verbenaceae. In *Nyctanthes* the vascular cylinder is surrounded by an interrupted ring of pericyclic sclerenchyma. *Nyctanthes* and *Dimetra* have small vessel members, but their diameter is within the range recorded for shrubby species of the Verbenaceae. Radial multiples are present as well as solitary vessels, and perforations are simple.

(2) *Nyctanthes* and *Dimetra* differ from most genera of the Verbenaceae of which the anatomy is known, in a few respects. For example :—

There are no extra floral nectaries or multicellular peltate hairs in *Nyctanthes* and *Dimetra*. The rays are uni- or bi-seriate which is narrower than is common within the family with the exception of *Pseudocarpidium* where they are exclusively uniseriate. Wood fibres are non-septate as in *Avicennia* and *Peronema*, not typically septate as reported in many members of the family. Pits in the walls of the wood fibres are conspicuously bordered, not simple as in the family, generally, though small borders have been reported in *Petrea arborea*.

(3) The following differences exclude the genus from the Oleaceae :—

Absence of the conspicuous peltate secretory hairs and extra-floral nectaries. Sclerenchymatous idioblasts not present in the mesophyll of the leaf. T.A. Rao (1947) has reported the presence of "sclerosed palisade cells" in the leaf of *N. arbor-tristis* but sclereids have not been observed in any of the material examined during this work. The absence of crystals and of spiral thickening in the xylem fibres.

There is therefore some evidence that the structure of *Nyctanthes* and *Dimetra* is consistent with their being included in the Verbenaceae. It should however be emphasised that only young stem material was available for examination and certain diagnostic characters of the wood, such as width of rays and vessel size, are known to vary with the age of the tissue.

Literature Cited.

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A NEW GENUS AND SPECIES OF BURMANNIACEAE FROM SOUTH INDIA.

H. K. AIRY SHAW.

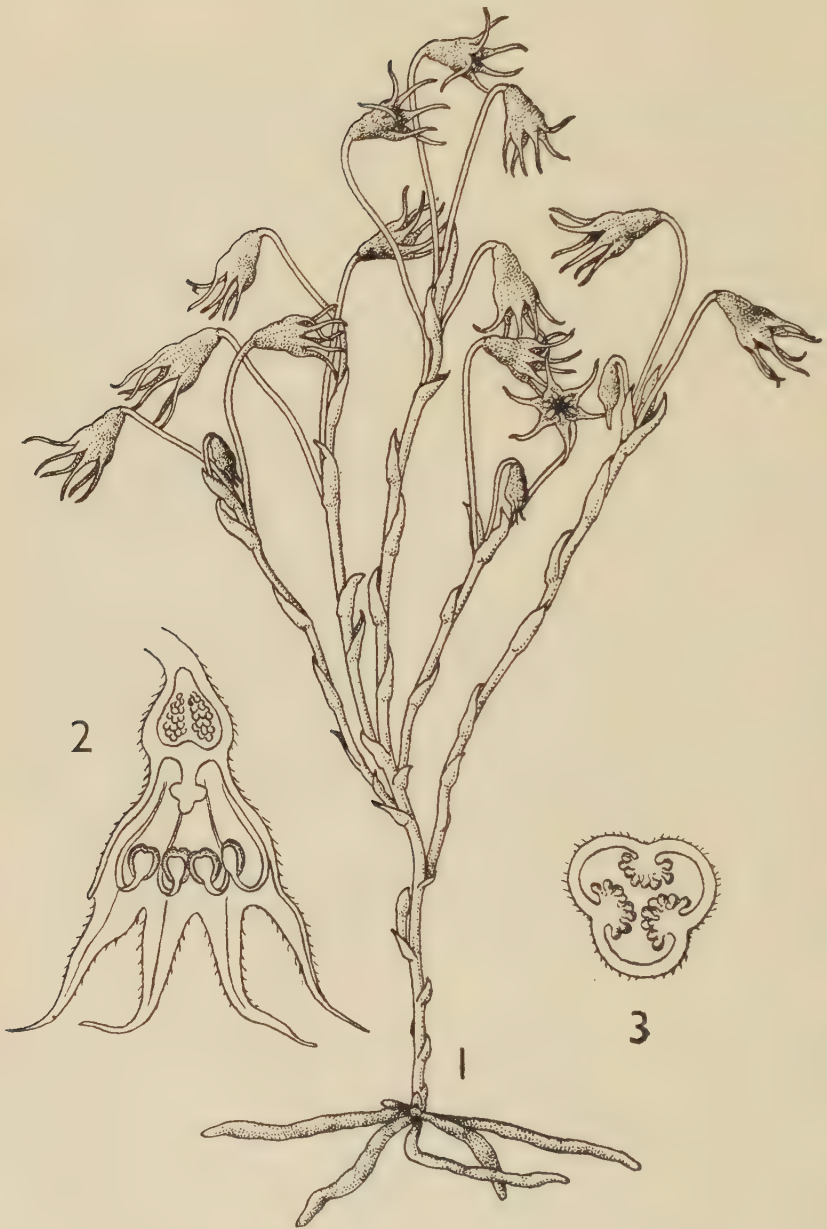
The plant forming the subject of this note was found by Prof. A. Abraham and Mr. K. C. Jacob, of University College, Trivandrum, S. India, when leading an excursion of botany post-graduate students to the Cochin Forest of Travancore-Cochin State, in October, 1951. As it seemed to be something quite unfamiliar, specimens, both dried and preserved in spirit, were forwarded to Kew for investigation. It soon became apparent, not only that it was an undescribed species, but that it represented a new and very distinct genus of *Burmanniaceae*, nearest to the tribe *Thismieae*. The latter tribe is represented in the Indian region, so far as is known, only by *Thismia Gardneriana* Hook. f. (Ceylon) and *Th. Brunonis* Griff. (Lower Burma).

Haplothismia *Airy Shaw*, gen. nov. *Flores* hermaphroditi, actinomorphi, trimeri. *Perianthium* infundibulari-campanulatum, ovario adnatum ; segmenta 6, velut uniseriata, similia, erecta vel patula, subulata, persistentia, annulo interno nullo. *Stamina* 6, perianthii segmentis opposita ; filamenta perianthii tubo adnata, apice libera et inflexa ; antherae pendulae, obovatae, basifixae, connectivo lato, re vera introrsae sed inflexione filamentorum extrorsae, rimis dehiscentes. *Ovarium* inferum, uniloculare, placentis 3 parietalibus intrusis multi-ovulatis. *Stylus* brevis, crassus, cavus, breviter hispidulo-pilosus, stigmatibus conicis inferne breviter 3-lobis, lobis deflexis rotundato- vel subgloboso-clavatis hispidulo-pilosis. *Ovula* numerosissima, anatropa. *Fructus* ut videtur capsularis et loculicidus, polyspermus. *Semina* parva, ovoidea, testa laxa reticulata. *Embryo* minutus, partibus singulis vix distincte cernendis, in endospermo immersus.

Herba aphylla, saprophytica, perennis, parce ramosa, pilis brevibus crispulis multicellularibus (?) undique sparse induta. *Folia* ad squamas redacta. *Inflorescentia* sympodialis, pseudo-racemosa, acropetala, pauciflora, pedicellis elongatis. *Flores* majusculi, cernui.

Species unica : *H. exannulata*.

Haplothismia exannulata *Airy Shaw*, sp. nov. *Herba*, 10–25 cm. alta. *Radices* paucae (3–6), breves, fasciculatae, subcarnosae, \pm vermiformes, 1.5–3.5 cm. longae, fusco-brunneae, horizontales. *Caulis* inferne per 2.5 cm. in solo sepultus, gracilis, erectus, simplex vel inferne usque 5-ramosus, pallide cremeus, parce breviter crispulo-pubescent, cortice lato omnino parenchymatico, stele angustissima. *Squamae* numerosae, sed dissitae, spathaceae, ovato-lanceolatae, inferiores 3–4 mm., superiores 8–9 mm. longae, acutae, erectae, membranaceae. *Inflorescentia* 3–6-flora, breviter crispulo-puberula ; pedicellis erecti vel patuli, 3.5–5.5 cm. longi, basi squama oppositiflora instructi. *Flores* extra cremei, tubo intus pallide brunneo pilis minutis pallide brunneis in seriebus longitudinalibus dispositis praedito. *Perianthium* cum hypanthio totum 10–19 mm. longum, basi in pedicellum cuneato-angustatum ; tubus basi 10-nervis, superne tenuissime 15-nervis, ore 7–8 mm. diametro ; segmenta 5–8 mm.



Haplothismia exannulata Airy Shaw.

1. Plant, nat. size.
2. Flower, longitudinal section, $\times 4$.
3. Ovary, tranverse section, $\times 8$.

longa, apice valde attenuata, 1-nervia (e nervis 3 tubi coalitis). *Filamenta* leviter applanata, pallide violacea, e basi latissime deltoidea ex annulo humillimo membranaceo exorta, annulo dentibus 6 parvis breviter pilosis inter stamina instructo, squamis binis parvis laciniatis prope basin cujusque filamenti etiam exortis, connectivo obovato partim violaceo. *Ovarium* (hypanthium) 3–4 mm. longum, obovato-turbinatum. *Fructus maturus* ignotus, ut videtur capsularis et loculicidus, perianthio persistente. *Semina* numerosa, fusco-brunnea, testa prominenter reticulata.

SOUTH INDIA. Travancore-Cochin State : Parambikulam, in typical evergreen high forest* on slope of W. Ghats, in deep shade on very moist dark humus soil containing much visible fungus mycelium, alt. 450–600 m., 25 Oct. 1951, A. Abraham & K. C. Jacob (typus in Coll. Univ. Triandrum, dupl. in Herb. Kew.).

The floral structure of this interesting plant is the simplest so far known in the *Burmanniaceae*. The six perianth-segments are all equal and free at the apex (as in *Thismia* Subsect. *Odoardoa* Schltr.), but there is no trace of the annulus at the mouth of the tube that is such a conspicuous feature of most of the tribe *Thismieae*, and the perianth is persistent, not circumscissilely caducous. The filiform or slightly flattened filaments are paralleled only by those of the genus *Afrothismia*; they are also inserted on the perianth-tube, and recurved towards the base of the flower, as in that genus. The connectives, however, though broadened, are quite devoid of the complex appendages found in *Thismia*, or even of the simpler prolongations of *Afrothismia*, and the anthers remain quite free of the stigma.

Haplothismia thus represents an isolated type in the family, and appears to require tribal recognition, since it evidently cannot be placed in either of the tribes recognized by Jonker (1938, *Monogr. Burmann.*, 10, 52).

The three tribes will then be distinguished as follows (distinctive characters italicised):—

BURMANNIEAE Miers. Perianth persistent; no annulus in mouth of tube. Anthers 3, subsessile in perianth-throat; thecae dehiscing transversely. Style equalling perianth-tube.

HAPLOTHISMIEAE Airy Shaw†. Perianth persistent or decaying; no annulus in mouth of tube. Stamens 6, inserted below mouth and recurved-pendulous in tube; thecae dehiscing longitudinally. Style very short.

THISMIEAE Miers. Perianth circumscissile; annulus or diaphragm present in mouth of tube. Stamens 6 (rarely 3), pendulous below annulus; thecae dehiscing longitudinally. Style very short.

The floral structure of *Haplothismieae* represents the least specialised type found in the *Burmanniaceae*. On the whole it appears to be nearer to that of the *Thismieae* than to the *Burmannieae*, for the absence of the annulus-cum-circumscissile-‘dehiscence’ of the perianth makes for a fundamental distinction, and I believe justifies the treatment proposed.

* Associated tree-species noted in the type-locality included *Bombax malabaricum* DC., *Schleichera trijuga* Willd., *Vitex altissima* L.f. and *Aporosa Lindleyana* (Wight) Baill.

† **Haplothismieae** Airy Shaw, trib. nov. Perianthium persistens vel marcescens; annulus internus nullus. Stamina 6, infra os inserta et in tubum recurvo-dependencia; thecae longitudinaliter dehiscentes. Stylus brevissimus.—Genus unicum: *Haplothismia*.

The R.H.S. Dictionary of Gardening.*—The publication of a Dictionary of Gardening as comprehensive as that under review is an event of major importance in the horticultural world, such dictionaries being by tradition and history encyclopaedic in scope. This great work, of four volumes, is based on Nicholson's *Illustrated Dictionary of Gardening*, which appeared, also in four volumes, in 1884–1888, with a "1900 Supplement," and which has been such a mine of information to past generations of gardeners and others in this and other English-speaking countries, but which has become in various respects out of date and 'Victorian.' The intention was that the new dictionary should be a revised Nicholson, but there was found to be so much to alter and so much new material to include, due largely to the rich introductions of plants in recent years to our gardens and greenhouses, especially from Eastern Asia, that it was decided to give the present work a new title. Still, as pointed out in the Preface, it can claim direct lineage back beyond Nicholson through earlier nineteenth century authors to Philip Miller, whose *Gardener's Dictionary* of the seventeen-hundreds ran into many editions, and ultimately to John Parkinson's *Paradisus* of 1629.

It would be presumptuous for a botanist to attempt to analyse the merits of the horticultural contributions, such as those most numerous ones on the cultivation of plants, both hardy and tender, and on their diseases and pests. As, however, they have been either revised or rewritten by well-known experts on these subjects, there is no doubt as to their soundness, for scientific research in horticulture has made considerable strides since the days of Nicholson, though some garden practices go on without essential change from generation to generation.

Although one may thus reasonably assume that the horticultural content of the *Dictionary* is of good quality, there is evidence, unfortunately, that many careless mistakes have been made in cross-referencing. Several of these occur, to give a chance example, in the long article on the apple (pp. 148–149). "The method of planting does not differ from that proper for other trees (*see* Planting) . . ." : there is no paragraph "Planting". Again, discussing a grass orchard ("*See* Grass, effect on trees.") : no such heading, only "Grasses, Lawn" and "Grasses, Ornamental." Thirdly, ("*See* Pollination in orchards."), but a search for this paragraph is in vain. Finally, still under "Apple", "Apples respond . . . to Lorette pruning (*see* under Pruning)." Under "Pruning" there are only six lines of definition, with no mention of any kind of pruning of fruit trees. Other such errors, taken at random, are "Bee, Hive [p. 253]. (*See* Pollinating Insects)"; "Gravel Walks [p. 922]. *See* Walks." It will be noted, too, that some cross-references are in brackets and some not.

It is with the botanical aspect of the *Dictionary* that this review is chiefly concerned, and in this regard it must be said at once that, though the whole great project was obviously planned with vision, the fulfilment from the botanical point of view, at least in the earlier volumes, falls short of the grand conception. This is no doubt mainly due to the unfortunate

* The Royal Horticultural Society's Dictionary of Gardening : A Practical and Scientific Encyclopaedia of Horticulture. Edited by Fred J. Chittenden, assisted by Specialists. 4 volumes, quarto ; 2316 pages and numerous text figures. 1951. Clarendon Press, Oxford. £10/10/0 net.

fact that the work was begun at a most unpropitious time, on the eve of the Second World War, and continued through its early years. That was a very difficult period, when botanists who would surely have been asked to collaborate were mostly divorced from their plants and books and often themselves inaccessible. It could not be expected that the able group of horticulturists and gardener-botanists working under the leadership of Mr. F. J. Chittenden would be able to deal adequately with the botanical side of the work, involving specialist systematic knowledge and more than a nodding acquaintance with the current Rules of Botanical Nomenclature. They struggled on, however, until the untimely death of the editor in 1950, when two of the large quarto volumes had been printed off and the other two were in either page or galley proof. In the circumstances it might have been wiser to keep the *Dictionary* in manuscript until the return of easier and happier times. As it was, the new group of helpers who were called in, including professional botanists, some of whom are noted specialists, found it impossible, because of the advanced state of the printing, to do more than restricted revising of genera for the third and fourth volumes. Chief among these competent authorities was Mr. W. T. Stearn, who did the lion's share of this final task. He worked back into the proof as far as possible, correcting the frequently erroneous nomenclature by one device or another, rewriting a completely lost portion of the *Dictionary*, revising genera, and providing keys, of which *Thalictrum*, *Thymus*, and *Viola* may be mentioned as outstanding examples.

It will thus be realised that the botanical matter leaves much to be desired, and it is earnestly to be hoped that the promised supplementary volume will contain, in addition to its major features, announced in the Foreword, correction and revision of the earlier part of the *Dictionary*. As an example of this need the reviewer naturally chooses *Carex*, which the *Dictionary* states is a genus of "perhaps 600 or more species," whereas the great caricologist, Kükenthal, who was a cautious and conservative botanist, described nearly 800 *Carices* in his monograph in Engler's *Pflanzenreich* as long ago as 1909, a number which has now increased to at least 2,000 known species.

The numerous text figures are rather uneven. Some are not characteristic examples of the genera to which they belong, others have become dulled through copying down the years, but a fair number are drawn from living plants and are adequate and pleasing.

After this general appraisal of the new *Dictionary* it would be unfitting and invidious to pick out and criticize vulnerable items, all of which will no doubt be rectified in the fifth volume. This comprehensive and informative work will prove as great a boon to present and future generations of plant lovers as Nicholson's has been to those of the past, and The Royal Horticultural Society should be heartily thanked and congratulated on this great occasion.

E. NELMES.

Plant Physiology*—It was a common complaint amongst botanical students in the 1920's that no modern textbooks dealing with plant physiology then existed. The position has changed completely in recent years, owing to the appearance of a number of English textbooks on the subject both in Great Britain and the U.S.A. It might, therefore, be wondered if the publication of yet another elementary text would serve a useful purpose. It must be remembered, however, that plant physiology is a subject concerning which fresh information is constantly being gained, and it is therefore becoming increasingly difficult to decide which aspects of the subject should be presented to students, and how to give them a clear picture of the subject as it stands without becoming involved in, or excessively dogmatic about, controversial topics. An effective test for a textbook is to make use of it in preparing an actual course of instruction. This the reviewer has done in connection with a course of lectures for student gardeners, and Bonner and Galston's textbook has been found most stimulating and refreshing when used for revising and modernising the lectures in question. The presentation of the subject matter is exceptionally clear and easy to follow ; there are no dry tables of figures which do so much to discourage students ; plants are treated as if they have a structure that is intimately related to their physiological processes, and the aspects of the subject selected for presentation are precisely those about which a student of applied botany is likely to seek for basic information. The book is admirably illustrated with numerous simple graphs, and by line drawings which make clear at a glance the essentials which the authors wish to convey in the text. These illustrations will undoubtedly be a real help to those students who find plant physiology a difficult subject to grasp. The book is divided into 3 main sections of about equal length, dealing with nutrition, metabolism and growth and development respectively, each section being divided into a number of chapters of which there are 20 in all. At the end of each chapter there is a set of questions which the reader should be able to answer if he has really understood the text. Carefully selected references for further reading are also given for each chapter, and it is encouraging to find that these do not refer exclusively to American work. The book ends with an index.

Whilst it is quite possible that specialists in certain branches of plant physiology might feel that their own subjects have not received adequate attention, or that their pet theories are not sufficiently emphasized, to the reviewer it appears that any student who masters the contents of this book will have received a broad and stimulating grounding in plant physiology. The book can be recommended with confidence.

C. R. METCALFE.

*Principles of Plant Physiology by James Bonner and Arthur W. Galston. San Francisco, W. H. Freeman and Co. ; English agents Bailey Bros. and Swinfen Ltd. London. pp. x + 509 : 219 illustrations. Price \$5.50 (£2 7s. 0d.).

A NEW SPECIES OF FRITILLARIA FROM THE HIMALAYA.

W. B. TURRILL.

The fritillaries of the Himalaya and Western China are taxonomically very puzzling, but very interesting. In particular, the *Fritillaria cirrhosa*—*F. roylei* group at present seem to defy satisfactory classification along the lines of orthodox systematics. Whether this be due to the inherent peculiarities of fritillaries being more marked at the high altitudes of the Himalaya, or to hybridization, or to the absence of adequate collections and of localized living material in cultivation is uncertain. The exasperated taxonomist frequently relieves his feelings by exclaiming that "species cannot be determined" among the fritillaries of the Himalaya (and also elsewhere). However, the need for more collecting of both good herbarium material and of bulbs and seeds for the cultivation of living plants in our gardens is obvious to any botanist who has worked through the specimens preserved in various European herbaria. We are indebted to the authorities of the British Museum (Natural History) for allowing us to examine in detail the series of specimens collected in the Himalaya by Ludlow and Sheriff and by Ludlow, Sheriff, and Hicks. In 1949 there were collected specimens of a *Fritillaria* which has not been matched at Kew or the British Museum or determined from literature.

Fritillaria bhutanica Turrill a *F. delavayi* Franch. floribus minoribus, antheris longioribus praecipue recedit.

Bulbus ellipsoideus vel ellipsoideo-ovoideus, 2.5–2.7 cm. longus, 1.5–2.0 cm. diametro. *Caulis* uniflorus, 1.1–2.0 dm. altus (supra bulbum), glaber. *Folia caulina* 3–4, aggregata, spiralia, glabra; inferiora elliptica, ovato-elliptica, vel plus minusve late lanceolata, apice subobtusata vel rotundata, cucullata, basi vaginata vel amplexicaulia, 3.5–5.5 cm. longa, 1.5–2.5 cm. lata; superiora lanceolata, 2–5 cm. longa, 0.6–1.1 cm. lata. *Flos* erectus vel suberectus; pedicellus 1–1.5 cm. longus. *Tepala* exteriora oblonga vel angustissime elliptico-oblonga, apice rotundata, 2.5–2.7 cm. longa, 8–9 mm. lata; interiora elliptica, apice rotundata, 2.3–2.5 cm. longa, 1.3–1.5 cm. lata. *Filamenta* 5 mm. longa; antherae dehiscentes 1.0–1.1 cm. longae, 1 mm. latae. *Ovarium* 7 mm. longum; stylus 8.5 mm. longus, clavatus, indivisus. *Capsula* 2 cm. longa.

BHUTAN. Nelli La, near Lingshi Dzong (89° 30' E., just S. of 28° N.) 20.5.1949, in dry scree, 4500 m., *F. Ludlow, G. Sheriff, and J. H. Hicks* 16296.

This interesting species is presumably related to *Fritillaria delavayi* Franch. in Journ. de Bot. **12**, 222 (1898). The type of this has not been seen by the writer, but it was collected in Yunnan, "entre les pierres mouvantes à la bas du glacier de Likiang. Alt. 3800 m. (*Delavay*, n. 27)." Specimens from the eastern flank of the Lichiang Range (*Forrest* 6175) are in the Kew Herbarium and with others have been used for comparison with the species here described.

It is unfortunate that so much pressure was used in drying the specimens of *F. bhutanica* that it is not possible to determine from the material seen various important characters of the bulbs and capsules. In the genus *Fritillaria* such organs should be dried without pressure or should

be preserved in a spirit mixture. One would judge that the bulbs are normally situated at a relatively deep level in the soil and probably the leaves, which are bunched together near the top of the stem are only just above soil level. In other words, most of the stem arising from the bulb is below ground level and only some 3 to 6 cm. of the plant is above the soil. A very unusual feature, shared with *F. delavayi*, is the persistence of the tepals in the fruiting phase. They remain attached to the receptacle generally until the capsule is fully mature and the seeds have been shed.

The collectors' label gives the following colour notes : Leaves olive brown. Perianth olive brown on outer surface, greenish on inner surface. Anthers green and black.

An unpublished 1810 Diary*.—It was in the year 1807 that Thomas Nuttall, the son of Jonas Nuttall, a printer of Blackburn, Lancashire, first visited the United States, and from that time onwards his life was devoted almost exclusively to natural history pursuits. Nuttall's travels were extensive and he explored nearly all the states of the union and made many observations of great value.

The publication of this Diary is a most interesting contribution to our knowledge of his travels. The editor was fortunate in having the original, a small notebook of 124 pages, lent to her by its owner Major Dixon-Nuttall, and in printing from the manuscript the faulty punctuation and original misspellings have been retained. Nuttall, when he began this journey, was in his twenty-fifth year. The expedition was undertaken for Benjamin Smith Barton, Professor of Materia Medica, Natural History and Botany at the University of Pennsylvania and the route to be taken was outlined by him. Nuttall's journey began at Philadelphia on April 12, 1810, whence he travelled to Pittsburgh by stagecoach. He then journeyed on foot to Franklin, Waterford (Le Boeuf) and Erie, along the southern shore of Lake Erie to the Huron River. Thence he went to Detroit by boat. Here he stayed from June 26 to July 29 and the account of his observations of the Detroit area occupied about one-eighth of the notebook. Under date July 29th, Nuttall writes : " I left Detroit for Michilimakinak in a birch bark canoe accompanied by the surveyor of the territory ". The next dated entries were made on September 9 and 10. On the 9th he left Le Bay and travelled up the Fox River and on the 10th he reached the portage to the Wisconsin. Later entries follow, but these bear no date. The diary ends with a " Cash Account " followed by the Appendices. Of these, Appendix I gives the Terms of Agreement, dated April 7, 1810, between Barton and Nuttall, and Barton's Directions to Nuttall. Appendix II lists the animals noted by Nuttall and Appendix III, the plants. The work, which forms a part of the well known periodical " *Chronica Botanica* ", contains a reproduction of a page from the diary, two maps, a portrait of Nuttall and other illustrations of historical interest.

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*Nuttall's Travels into the Old North West : An unpublished 1810 Diary. By Jeannette E. Graustein. (*Chronica Botanica* xiv, nos. 1/2). Waltham, Mass. : Chronica Botanica Co. ; London, W.C.2 : Wm. Dawson and Sons, Ltd. Pp. vii, 86, pls. 69-79. Price \$3.00.